

INSIDE: THE ULTIMATE OS/2 GAME CONTINUES!

OS/2 Monthly

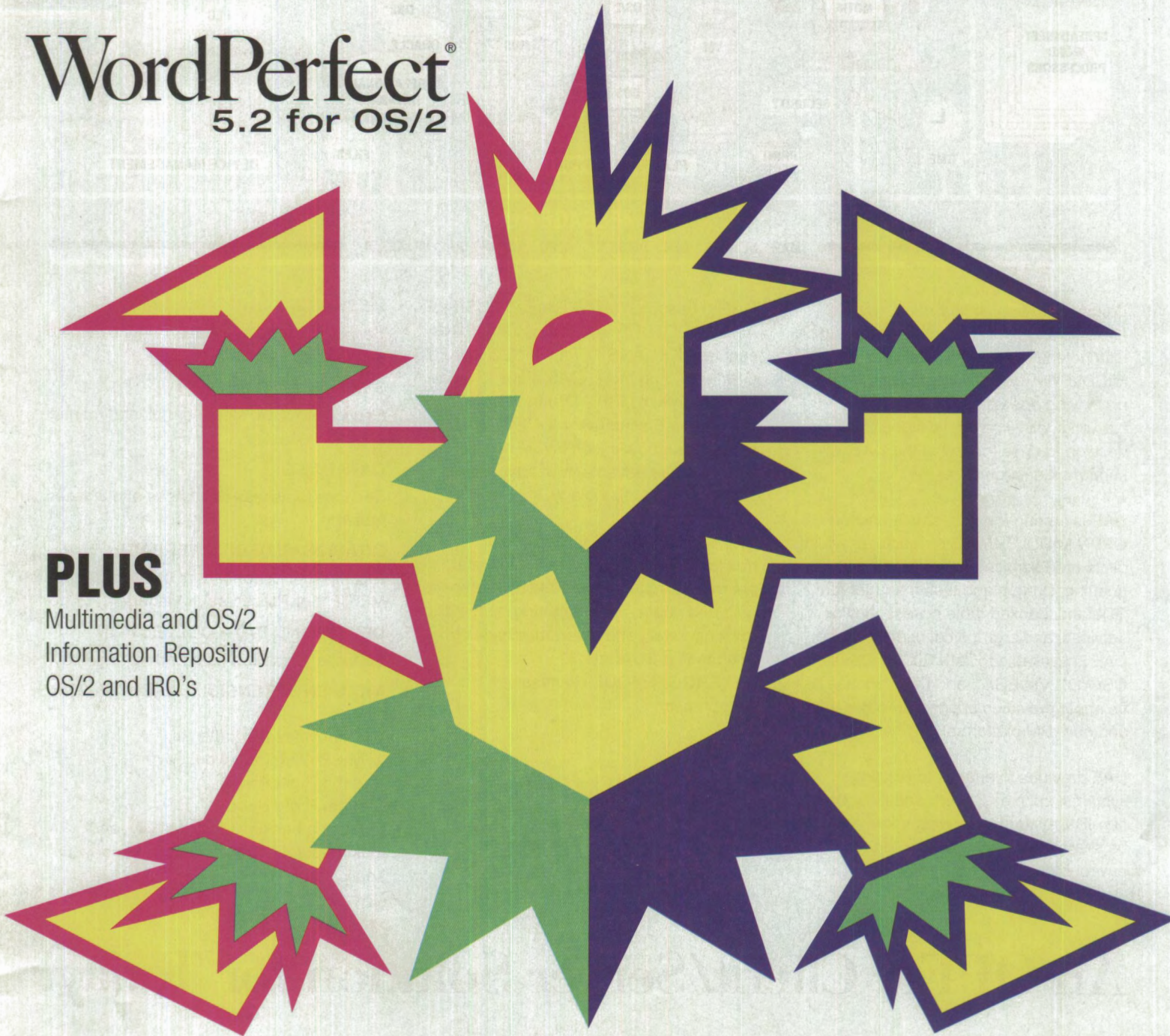
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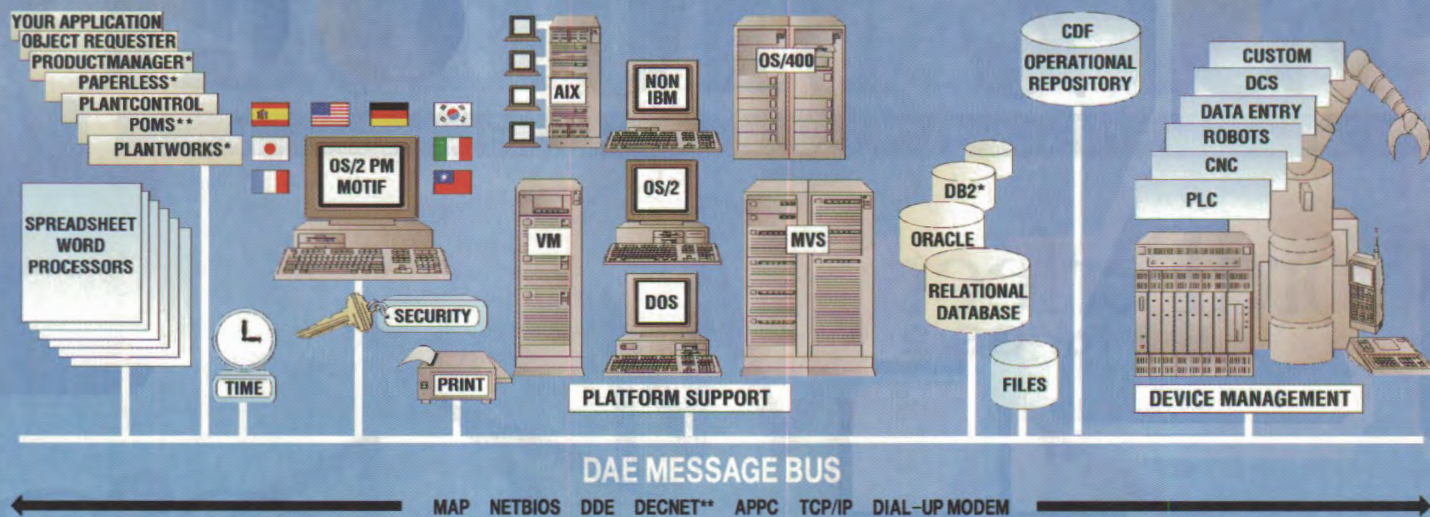
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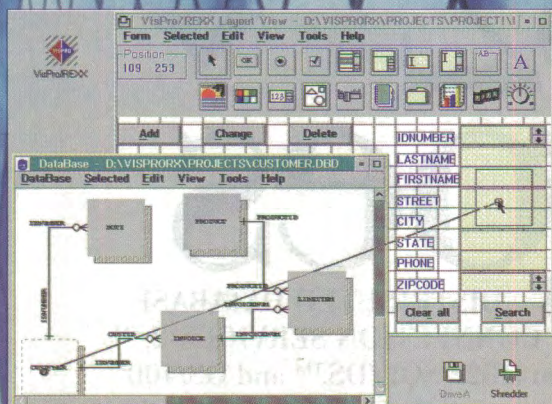


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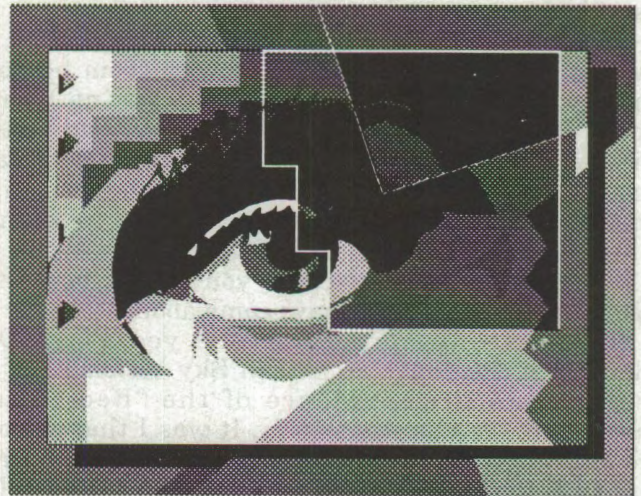
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Publishers Notes

An Award Winning Investigative Report: Meta-Gene Incursion(tm) of Metaphors

By Jimmy Headcam Contributing Publisher

The plaza was crowded, but no crowd could block the upward view of the magnificent World Trade Towers. The Towers are set corner to corner. The Plaza sits like a large lake on the edge of the 2 monstrous structures. Midday, during the summer months, the bands come and liven things up. Rock, Jazz, Blues, Oldies, and all by the best groups. The band and the crowd make the show very exciting. It makes one think of what they do in Rightville, Rhode Island for excitement.

Rightville, RI. Home of "Ominous Legion™", a new four-color Supers team. (Note from editor: Supers is short for Super Heroes/Villains.) Yep, Supers. Like right out of the comics. Who would have believed that in this day and age Supers could actually exist. I sure didn't. To research this phenomena, I contacted Doctor Wilton Hasbro™, famous Meta-genealogist for an indepth interview.

J.H.: Doctor Hasbro, could you tell us how this Superhero business could have come about?

Doc: Well, Jimmy... About 3 years ago Dr. Hokum™ of the North American Sky Vision Labs™, recorded the first evidence of the "Red Phase Phenomena™." Simultaneously, It was I that discovered the Sotox-mega-gene, and the theory of Relative Meta-Genetics. Now, You might ask, "Is there a relationship between the two incidents?" I must insist that there is. Preceding every instance of an "Origin", there is a "Red Phase™" incident (Editors Note: See bibliography for articles pertaining to the "Origin of Various Super or Meta-Enhanced Human Beings")

J.H.: So they are all super heroes, Right?

Doc: I don't know if I'd say that. Remember, Power corrupts. I've had several, run-ins with the Leader of the Ominous Legion™, and he's been demanding information on the Red Phase Phenomena™. Scary. Very Scary,

J.H.: The public needs to know about the true Super Heroes. Could you clue us in?

Doc: Well, sure, Jimmy... Isaac Gee™, of Gee H.Q. He runs the Red Phase Team™. Incredibly Powerful, and reliable team. And then there is Team OS/2. Now, there is a team. Semaphore Woman™ with here amazing Time-Stop Power. Winbroadcast Man™, a hero with incredible communication powers.

Dynamic-Alocx™, a flying energy projector. And WinDu™, the Martial Artist.

J.H.: (scratching head, looking perplexed) Is there anyway to get in touch with them?

Doc: Try compuserve... **Compuserve™**, OS2USER, Section 9, Ask for Vicci Conway, she is their liaison. OOPS! Forgot to fix a teleporter widget. Keep the Faith. (Doctor touches a button and he disappears in a bright flash.)

J.H.: There have you have it. Like he said Keep the Faith. Jimmy Headcam, Contributing Publisher for OS/2 Monthly.

Awards

This month we continue with our software awards. The OS/2 Monthly Performance award goes to BocaSoft for their System Sounds for OS/2. System Sounds adds audio functionality beyond the Multimedia that ships on the OS/2 CDROM. Besides associating sounds with action (such as open and closing objects), it also allow the programmer to associate sounds with messages. This is a cost effective way to add Multi-media to your product. The coveted OS/2 Monthly Application Award goes to Raleigh Systems for ObjectPM, a third party 'class library' that provides the means to develop object oriented OS/2 applications in C++.

Electronic Contact

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Software Give-away

OS/2 Monthly Software Give-away. Make sure you return the reader service card enclosed in this magazine. It show the vendors that you read our magazine, and they like the attention. This month we have a CA compiler and some other goodies to give away. We'll pick a few at random and send you the stuff right away.

Nuff said.

32 SOMETHING!

WordPerfect 5.2 For OS/2

Doug Azzarito

WordPerfect 5.2 for OS/2 was supposed to be the application for OS/2. This was the one to show all computer users why OS/2 is so great. The "Word Perfect seal of approval" was going to legitimize OS/2 for use by everyone, but something went wrong. Last November, WordPerfect Corp. announced they would not be doing any new OS/2 development, but they would continue to support 5.2. In this month's column, I'll review the product, and try to explain what happened - let's hope other software makers don't make the same mistake.

Before you fill my e-mail box with letters, Let's get one thing straight. Yes, this column is "32 Some thing," and it is suppose to be about 32-bit applications. WordPerfect 5.2 for OS/2 is not 32-bit.

They used Mirrors to port their Windows code to OS/2, and that's one of the big blunders that doomed the product. I don't think any OS/2 user is going to accept the limitations of a Windows product in a native application. I expected more from WordPerfect - after all, their Windows product started out as an OS/2 program. They should have known better.

The Package

The perfect-bound reference manual is just over 900 pages, and contains the answers to all the questions you'd normally ask the friendly Wordperfect support people. Now that WordPerfect is phasing out free support hotlines, perhaps more users will actually read the manuals? A smaller "Workbook" contains 300 pages of tutorial lessons (for WordPerfect veterans, these may be known as "The Saga of Halva International"). An even smaller "Transition Guide" will help WordPerfect users get up to speed on the OS/2 version quickly, and a "General Information Guide" lists the many WordPerfect support telephone numbers, and some "frequently asked" questions. An OS/2 version of Grammatik 5 is included with WordPerfect 5.2, and a separate manual is included.

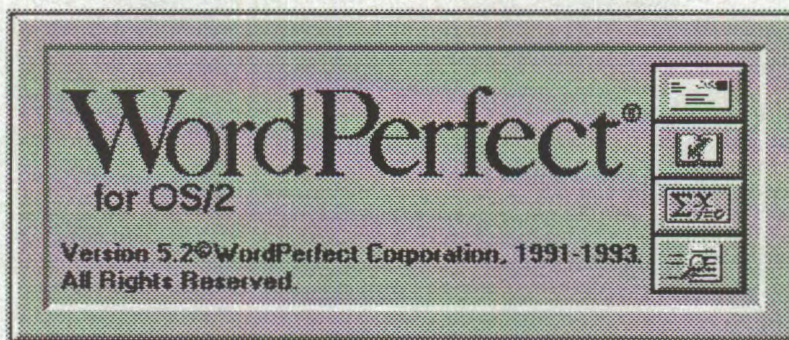
Inside the "media" box, I found seven 1.44MB diskettes, and two function key templates (one for the WP 5.1 key layout, the other for a CUA layout). A "junk mail" envelope contained a single advert for Golden CommPass (a Compuserve navigator). The last piece of paper is perhaps the most interesting - the "Easy Move" request form. "Easy Move" is WordPerfect's answer to the operating system wars. Rather than make you choose a platform, WordPerfect lets you explore them all. "Easy Move" lets you request a license to run the DOS, Windows and OS/2 versions of WordPerfect for the price of just one product. So, if you buy Word Perfect 5.2 for OS/2, and want to compare it to the Windows product, just

fill out the "Easy Move" form and you can legally make a copy of WordPerfect 5.2 for Windows. If you can't find someone who will let you copy the disks (let's hope they ask to see your license agreement first!), WordPerfect will mail you the disks for a small fee. If you own a license for WordPerfect 6.0, you can "Easy Move" to 5.2 for OS/2, but you can't go from 5.2 to 6.0 (that would be considered an upgrade). "Easy Move" is the best feature of the product, and one that every software company should clone. Let's face it, there are still users who aren't sure about OS/2, and an offer like "Easy Move" can ease the migration.

Installation

The installation program was easy, yet powerful. If you select the default installation, you'll spend about 15 minutes waiting for WordPerfect to consume just under 16MBytes of your disk space. The status window during install is simple, yet informative, and is NOT operating with the system thread, so you are free to do other things while install is in progress (shouldn't that be a law?). In contrast,

WordPerfect 6.0 for DOS took over 20 minutes to install, and consumed the same 16MBytes of space.



WordPerfect 5.2 for OS/2

The longer install is partly due to more questions during the install of 6.0 (VGA card, fax modem, sound card).

Using WordPerfect

After the installation completes, your system will need a re-boot to recognize the changes made to the CONFIG.SYS -nothing fancy, just an addition to PATH & LIBPATH. A WordPerfect folder is placed on the OS/2 desktop, and contains the program and folder objects you'll need to use WordPerfect. Loading the WordPerfect program is as "Workplace aware" as you'd want. You can start the WordPerfect program object, or you can "start" any WordPerfect file. Drag and Drop works the way it should - if you drop more than one WordPerfect document onto the WordPerfect program, you don't get two copies of WordPerfect, you get two documents inside one copy of WordPerfect.

Association of WordPerfect files is done automatically, which can be a bit unnerving. When you open ANY folder, WordPerfect's "Automatic Document Detection" (ADD) will search for WordPerfect files and tag them for use by WordPerfect. Extended Attributes are attached to all WordPerfect documents, which can consume considerable space if you have large collections of WP files on a FAT drive. Once ADD process a file, the settings notebook for that file will contain an additional page for WordPerfect-specific information, and this information can be added to the "details" view of the folder, or used as a folder sort operation. There doesn't seem to be a way to disable ADD, which is a shame. I've seen it fail several times, and it can noticeably slow the system when opening folders with many files.

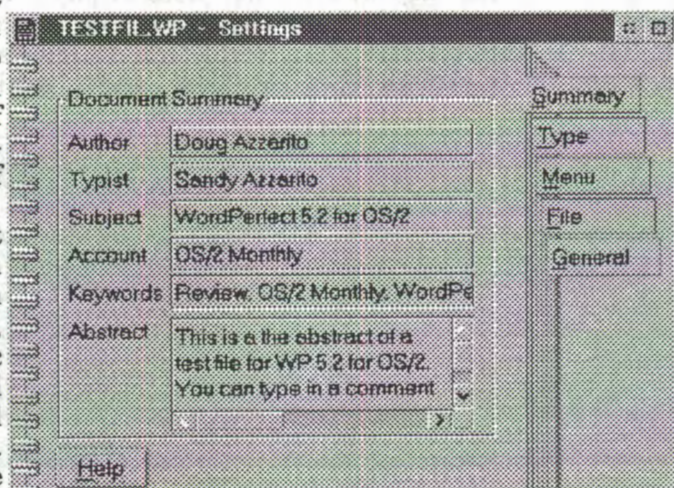
As I warmed up the "32 Something" stopwatch, I prepared myself for some dismal performance results. WP 5.2 for OS/2 loaded in just under 16 seconds, while 6.0 for DOS took just under 13 seconds to load (both in graphics mode, with a Button Bar). The OS/2 version loaded a file just as quickly as 6.0 for DOS, and saved a file in half the time its DOS sibling took. Loading OS/2 didn't put a terrible strain on RAM resources, either. A blank WordPerfect window did claim 3MBytes of RAM, but almost every byte is either swappable data or discardable code. Testing file load times uncovered the first symptom of "Windows porting." While WordPerfect loads a file, you cannot

switch to another task. For small files this may not be a problem, but try loading a huge file. Locking me out of the entire system (not just Word Perfect) was almost enough to toss the product, but for your sake I continued.

Scrolling text was the next major disappointment. The OS/2 version scrolled much more slowly than the DOS version, and could not keep up with the default key-repeat (even in "draft" mode). Scrolling "overrun" is an annoying problem, and not having a "live" scrollbar makes it even worse (the text window does not update as you drag the slider in the scrollbar). The scroll overrun problem has been solved by other programs. Some will discard any unprocessed scroll keys

as soon as the key is released, and others will decrease the screen update frequency if they can't keep up. Either solution is much better than the WordPerfect problem.

Another annoyance is the way Word Perfect updates the screen. As you type, the screen is constantly updated, which causes the text to flicker in draft mode. Perhaps the folks at WordPerfect thought we'd be spending all



our time in graphic mode?

What's New?

If you're already using WordPerfect 6.0 for DOS, or 5.2 for Windows, you may have to search for new features. The "Button Bar" is in the OS/2 version. If you're new to the concept, the "Button Bar" is a configurable collection of function icons. One click on a button can launch a WordPerfect function or macro. You can assemble the icons into groups that are specific to a certain task in WordPerfect.

The Button Bar is like a microwave oven. Once you've used it, you'll never give it up.

Many of the new OS/2-specific features are subtle, such as the way it interacts with the Workplace shell. Open any folder containing WordPerfect documents, and drag one to a printer. You don't have to load WordPerfect first -dropping a document on a printer will automatically start WordPerfect, format and print the document. The copy of Word Perfect does not close, it hangs around waiting for you to print another document, or open a WordPerfect file. No matter how you print, WP 5.2 for OS/2 does away with the wait.

All print activity is done in the background, so as soon as you select one document for printing, you can go back to work.

Another interesting feature is "drag & drop document assembly." If you hold CTRL-SHIFT while dropping a document onto a WordPerfect edit screen, WordPerfect will "insert" the dropped document into the current document. This is a great way to assemble a document from templates. If you have a large collection of "stock" paragraphs, you could piece together a new document in just a few seconds.

WP 5.2 for OS/2 supports both OS/2 and WordPerfect printer drivers. If you use the OS/2 driver, you can use all your ATM fonts, but you might want to try a

WordPerfect driver for faster throughput and a larger selection of printers.

Switching from one driver to another is easy, so you can experiment with both. WP 5.2 also supports a number of file formats, so you can load and save files made for "other" word processors. The two formats I wanted that weren't on the list were DeScribe and Word Perfect 6.0. That's right, if you create a file with WP 6.0 for DOS, you can't load it into WP 5.2 for OS/2 unless you select WP 5.1/5.2 format when saving in WP 6.0. Normally, I wouldn't expect this (after all, WP 6.0 is "newer" than 5.2), but WP 6.0 for DOS was released before 5.2 for OS/2.

WP 5.2 for OS/2 also supports long file names under HPFS, but there are some limitations. A "." in a long file name is treated as a file extension, so only the first three characters after a "." will be recognized. If you used the "long name" support in WordPerfect for DOS, the long names aren't shown in the WP for OS/2 file-box. I couldn't find an easy way to use the WP-style long filenames under 5.2 for OS/2. With ADD, I expected this to be automatic.

WYSI(almost)WYG

If you're using WordPerfect 5.1 for DOS, you're going to love the way Word Perfect for OS/2 looks. However, if you have already used a "modern" word processor, the look of WP for OS/2 may just be "adequate". The default view of an OS/2 document is close to WYSIWYG, but it's not perfect. There is still a

"print preview" option so you can see just what it is the printer is going to generate.

Using "draft" mode gives you the familiar Word Perfect text-mode screen, with colored text representing text attributes, and empty boxes representing graphics. Word Perfect is still in graphics mode, and the graphic Button Bar is available in draft mode. Switching draft mode on and off is easy, and it was the first button added to my personal Button Bar. If you are editing multiple documents, you can select draft mode for each document individually. When not in draft mode, you can speed up scrolling and repaints by turning off graphics. In this way, you see the text in its true font, but graphic pictures in your document will be represented by blank boxes. Turning off graphics may help, but it can't compare to the scroll speed possible in draft mode.

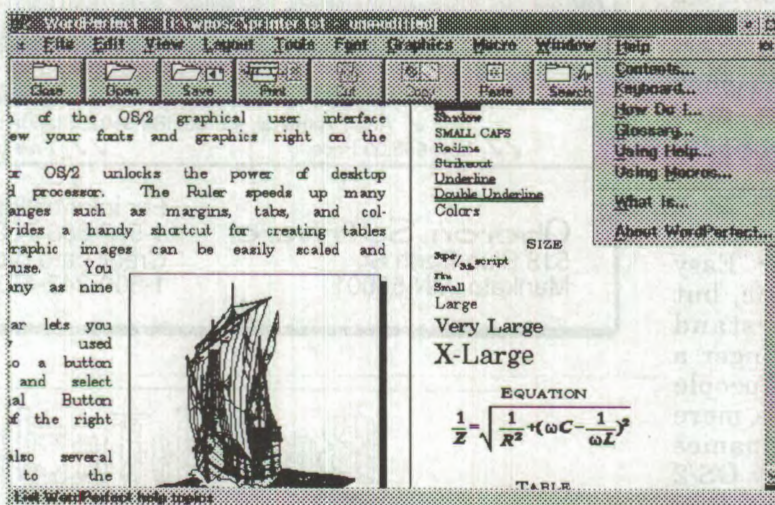
The Extras

WordPerfect isn't just a word processor anymore. The "extras" you get in the WordPerfect package form quite a bundle. You'll probably recognize the spell checker, thesaurus and Grammatik 5 grammar checker, but what about Quick Finder and

the File Manager? In a word processor?

The File Manager is a separate program that gives you an alternative to the "drives" object in OS/2. You can use the "File Navigator" to open drive and subdirectory windows, and when you find the file you're looking for, the "file viewer" window will show you what's in the file, or you can launch, move, print or otherwise manipulate the file. The file manager has its own application menu, Button Bar and text search tool. If you haven't mastered the drives object yet, the File Manager may be what you've been looking for.

QuickFinder is the savior of unorganized computers. Point this digital bloodhound at your hard drive, and it'll find the file you thought was lost for ever. Quickfinder builds "indexes" of files. You specify the drives and file names to index, and Quickfinder will build a compressed list of every word in the target files. Once an index is created, you can search the files for combinations of words and get near-instantaneous results. Quick-Finder is a wonderful tool, but if you are tempted (as I was) to index EVERYTHING on your hard drive, build the index when you don't



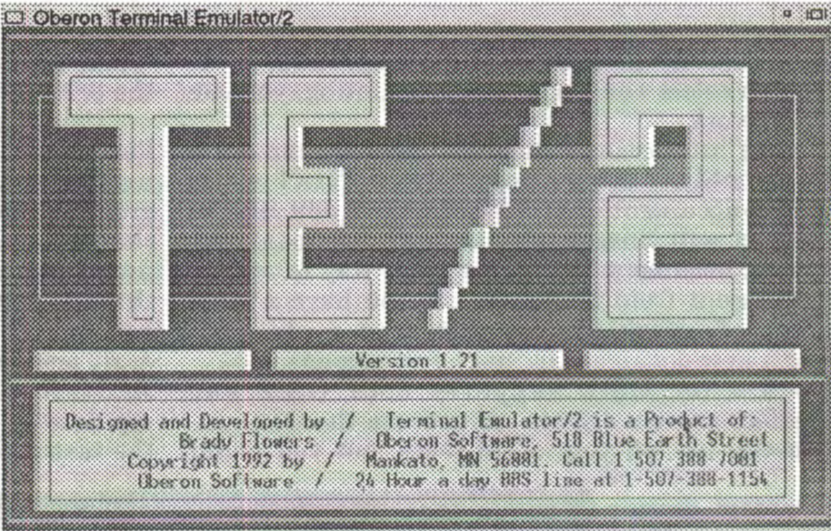
need your computer-creating a large index can take hours, and your once-snappy OS/2 machine will crawl if you ask it to do anything else while QuickFinder builds the index. Also, with out an easier way to exclude files from the index, you'll spend a lot of time processing useless files (compressed files, executables, DLLs, etc).

Conclusion

WordPerfect goofed. They used too much Windows code, which makes the program seem single-threaded. They released version 5.2 after 6.0 for DOS, and just before 6.0 for Windows. Do they think OS/2 users like buying older versions? Then, just as OS/2 sales started soaring, WordPerfect dropped support for their OS/2 version. I had high hopes for this product. They hired some of the brightest OS/2 developers on the planet, their "Easy Move" program was fantastic, but they obviously don't understand their customer. OS/2 is no longer a "niche" market. Millions of people use OS/2 every day. Millions more would use it if software companies exploit the features that only OS/2 provides. However, no one should expect success if they take last year's Windows code and peddle it as this year's OS/2 code.

Both the DOS and Windows versions of WordPerfect work under OS/2, but I want a native program - that's why I used DeScribe 4.0 to write this column (and will review it for you soon). It's a shame WordPerfect couldn't do things right. I was told WP 6.0 for OS/2 was going to be spectacular!

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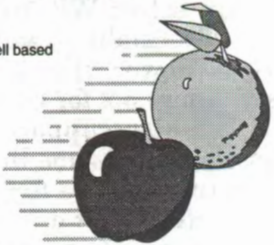
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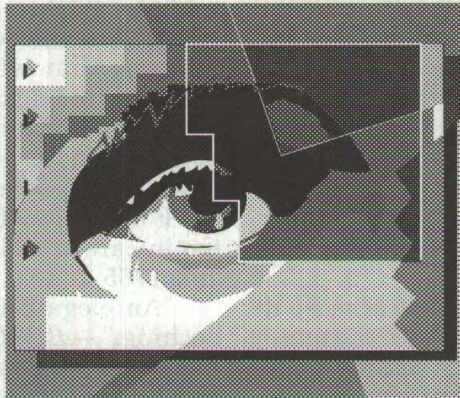
MANAGEMENT VISIONS

Shapeth Up and Getteth Thine Act Together

I recently had the opportunity to review a paper produced by a Japanese company describing its attempts to bring discipline and control to its systems development efforts. The paper was written by a manager from Ajinomoto Company Ltd. in Tokyo, a \$5 billion a year manufacturer of processed foods, feed, and amino acids. The author, Takuro Manezawa, described Ajinomoto's experience in developing four major enterprise-wide systems. These systems crossed different computer architectures (including mainframes, minis and PCs) and ultimately comprised over 2,600 programs written in COBOL and integrated through a relational database management system. Not only were these major systems developed in a relatively short time frame (three years), but they were of a high quality and enjoyed high user satisfaction. But what particularly piqued my interest was that the company was able to reduce the software engineering phases of development to approximately 21% of the overall process (with less than 5% actual ly spent on coding). When I mention these remarkable statistics to my colleagues in this country, they inevitably ask what CASE tool (Computer Aided Software Engineering) Ajinomoto was using. Surprisingly, Ajinomoto did not use any CASE tool whatsoever; all of the programs were designed and written by hand.

The significant difference was that Ajinomoto was extremely well

Tim Bryce



organized and spent considerable time in the up-front phases of development, studying the business problem, defining information requirements and engineering business processes, and specifying software requirements. This completely took the guesswork out of software engineering and allowed the programmers to develop software correctly the first time. Unlike traditional "trial-and-error" approaches to software engineering, Ajinomoto adhered to the following formula:

Good Systems Design + Good
Programming = Great Systems
Good Systems Design + Bad
Programming = Good Systems
Bad Systems Design + Good
Programming = Bad Systems
Bad Systems Design + Bad
Programming = Chaos

As Ajinomoto discovered, the common denominator for success was "good systems design." Consequently, the distribution of

effort on the average development project was:

2.61%	Project Planning
18.57%	System Study and Evaluation (requirements and feasibility)
11.61%	System Design
41.49%	Business Process Engineering
4.93%	Software Engineering
4.93%	Software Manufacturing
11.22%	Software Testing
4.64%	Business Process Testing

Instead of overloading the project with programmers, Ajinomoto emphasized user participation, project management, and overall systems engineering. As a result, software engineers represented a mere 30% of the development teams.

Ajinomoto's experiences represent the antithesis of the current state of the art in this country. Most American companies maintain a 3:1 or 4:1 ratio of software engineers to systems engineers. Whenever this occurs, it means that requirements are being superficially prepared and given to the programmers (on the backs of envelopes or on cocktail napkins, to use my favorite examples). Consequently, software engineers have to spend considerable time second-guessing what is needed and how it should be implemented. As a result, there is substantial reworking of designs and rewriting of source code; "firefighting" becomes the normal mode of operation by default.

Today, there is an abundance of CASE tools available which can

Management Visions

radically improve the process of designing and writing software. Unfortunately, no amount of elegant programming will solve a problem if it is improperly understood or specified to begin with.

Research studies show that as little as 25% of CASE tools purchased to date are being effectively used. This is not to discredit the tools; they competently perform the tasks they were designed to perform. Rather, it is an indictment of the process by which systems are developed. Without a defined and uniform process to build systems and software, the chances for CASE tool success are slight. This is a management issue, not a technical issue. After all, what came first: the assembly line or the industrial robot? Without an organized and regimented approach to development, CASE tools will be misapplied, inconsistent results will occur, there will be overlaps and omissions in work effort, and quality will suffer. Again, this is not the fault of the tool, it is the fault of the development methodology.

Pressured for time, the common lament of most IS managers is, "Getting organized and establishing a disciplined development environment sounds good, but we do not have time to do things right." Translation: "We have plenty of time to do things wrong." The Ajinomoto example discredits this theory completely. Simple organization and discipline alone achieved impressive results. Consider what will happen next when they begin to apply CASE tools.

There is also the problem of the CASE fanatics who believe their tool is a "womb to tomb" solution for development problems. Anybody who believes this probably also believes in the Easter Bunny, the Tooth Fairy, and James Martin. No, Virginia, there is not a single tool on the market that can satisfy all of your planning, design and development needs. This is because companies use different programming languages, design techniques (structured programming versus object-oriented programming), input/output techniques (graphical user interfaces versus full screen menus versus command languages, etc.), file management techniques (including various DBMS architectures), operating systems, etc. Computer technology is simply evolving too rapidly for a single vendor to offer a single comprehensive product that does everything. Companies will inevitably use a variety of CASE tools, and the problem will become one of compatibility. Unless the tools can share and reuse information resources, they will cause redundant work efforts and petty squabbling will arise between development personnel.

The bottom line: CASE tools can only be effectively

used if the development environment is explicitly defined and understood by developers. Otherwise, people will not know when or where to use them, thereby causing conflicts in the development effort.

But more than anything, organization and discipline will improve productivity far better than any tool or technique. This was the lesson Henry Ford taught us with the assembly line, and the lesson Ajinomoto demonstrated by its development methodology. Both were able to move development from an art to a science, and consequently were able to turn an uncoordinated development environment into one that was coordinated. The problem in the Western world is that we are enamored with technology and not with management; it is simply not fashionable to impose discipline, organization and control in developing systems. But you know what? It works.

For a copy of the Ajinomoto paper, please contact me in care of OS/2 Monthly, or send me a fax at (813) 786-4765.

"An elegant solution to the wrong problem solves nothing." —BRYCE'S LAW.

Tim Bryce is with the Tampa Bay management consulting firm of M. Bryce & Associates, Inc. (MBA).

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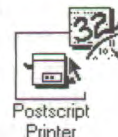
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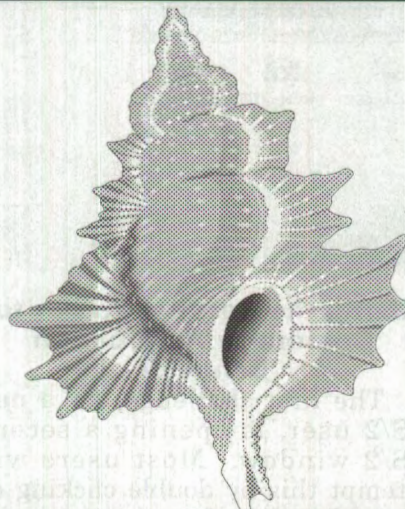
How to Organize an OS/2 Desktop So Even
Your Boss Can Find His Way Around!

A month ago, after teaching a beginner's class on OS/2, I received a call from one of the administrative folks at work. "Tom," she said, "I can't find anything on my desktop, and every time I go looking for something, it's underneath another window. How can I organize my desktop so even my boss can find his way around? You know how much he loves PCs!"

"Yes," I replied, "I sure do." He had been in several of my classes and resisted workstations with every fiber of his being. He was weaned on host systems, and was content to go to the grave with them.

It is difficult for new users to find their way around the desktop. Installing OS/2 creates many objects, which quickly get covered up as you run other applications. What is needed is an anchor, or starting point, to help find these objects without having to minimize everything. However, before you start organizing your desktop, you need to consider the way OS/2 han-

Tom Heald



dles windows. When a window is maximized, it moves to the upper left corner of the screen. When minimized, its icon appears in the Minimized Window Viewer or at the bottom of the desktop, depending on the Settings for the window. When taken together, these factors lead to the desktop organization shown above.

Active Program Area

Your high usage applications, which you rarely minimize, are located here. Typically, these will include a host session, if you connect to one, an OS/2 Window, and your favorite Editor. It is best to cascade the windows in this area, with enough room between them to allow for easy selection, as shown here. Other applications, which

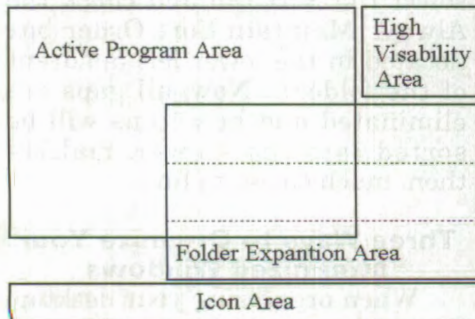
you use less often, also operate in this area and are generally minimized when not in use.

Icon Area

Icons naturally gravitate to the bottom of the screen, where they are less likely to be covered up by other windows. A good location for the OS/2 System icon is the lower right corner of the desktop, with the Minimized Window Viewer in the lower left corner, as shown below. All active icons, such as the printer and shredder applications, get moved to the bottom of the desktop and positioned between the Minimized Window Viewer and the OS/2 System icons. All inactive icons, such as the templates and information folders, get moved into the OS/2 System folder, which becomes an anchor for launching objects onto the desktop. (See *Organizing Your Desktop: Step by Step* for details on setting up the OS/2 System folder.)

Folder Expansion Area

This area is organized into three sections, one above the other, each having room for a folder two icons high and six to eight icons wide. The bottom section is for the OS/2 System-Icon View window. When it is expanded, and you double click on any of the folder icons located inside it, they should expand into the section directly above it. Don't try to tile or cas-



Organizing OS/2 Desktop

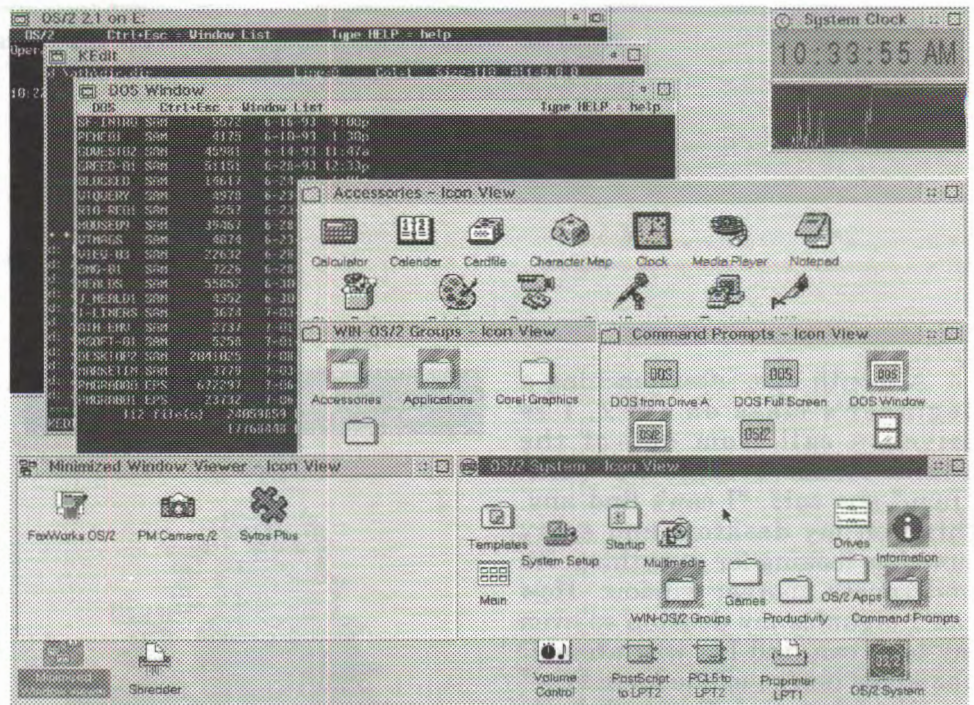
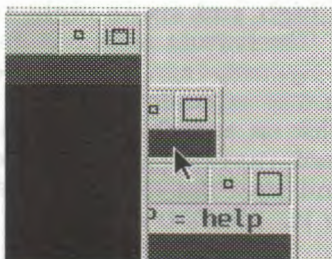
cade windows in this section; simply stack them one on top of the other. To switch back and forth between windows in the stack, click on the appropriate window's icon in the OS/2 System—Icon View window. This will pop the window to the top of the stack.

A window that contains other folders, such as the Win-OS/2 Groups folder, should expand into the third section. If there is a fourth level of folders, it should expand into the second section, with each new level alternating back and forth between the second and third sections. You will find that your most commonly used folders tend to stay on the top of the stacks. However, when a folder is buried, it is easily popped to the top by double clicking on its icon.

If your display is a little tight on space, have each of the folder windows overlap the title line of the window below it. When you select a window it will pop to the top, and the bottom row of icon titles will become visible.

High Visibility Area

This area is so named because it is the least likely area to be covered up by other windows. It is a good location for applications you always want visible, such as a clock and a performance monitor. Figure 3 shows Pulse (from the Productivity folder) with its Title and Options bars overlaid by the System Clock (from the System Setup folder).



Using the Settings folder to Customize Application Behavior

The first challenge, for a new OS/2 user, is opening a second OS/2 window. Most users will attempt this by double clicking on the OS/2 Window icon in the Command Prompts folder. Unfortunately, this only displays the OS/2 Window already running. To change this behavior, you must open the Settings folder for the OS/2 Window, select the Window tab, and push the Create New Window button as shown in Figure 4. Now, a new OS/2 Window is created each time you double click on the OS/2 Window icon.

If you have more than one version of OS/2 loaded onto your system, you may not always remember which one was booted last. This is easily remedied by changing the default name of the OS/2 Window to the OS/2 Version number and disk drive it is located on. Do this by clicking on the General

tab and filling in the Title field. This results in an OS/2 Window title like the one shown in upper left corner of Figure 3.

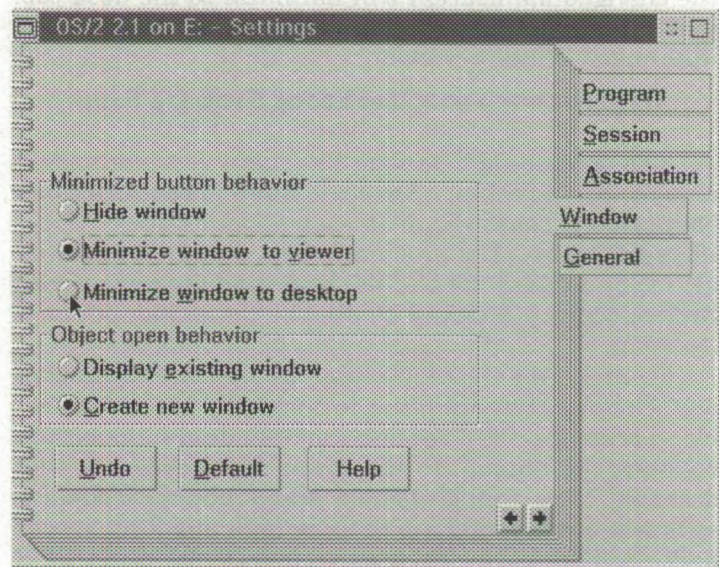
One last bit of customization pertains to the Minimized Window Viewer. As you minimize windows into and expand them from the viewer, the new icons are added to the end and expanded ones leave gaps behind. Eventually, you end up with icons spread out all over the viewer. The Minimized Window Viewer can always be sorted to remove the gaps, but this becomes tedious. For automatic sorting, open the Settings folder, select the Sort tab and check the Always Maintain Sort Order box (located in the lower left quadrant of the folder). Now, all gaps are eliminated and new icons will be sorted into the viewer, making them much easier to find.

Three Ways to Organize Your Minimized Windows

When organizing your desktop,

one of your more important decisions is where to keep your minimized windows. The default Minimized Window Viewer is the best choice for most people, especially if you have a lower resolution display with limited space. However, if you have a 19-inch display running at 1280 by 1024 resolution (we can all dream, can't we?) you may want all your windows minimized to the desktop. To change the system default, open the System folder (located in the System Setup folder inside the OS/2 System folder) and select the Window tab. Then push the Minimize Window to Desktop button and watch all the icons, in the Minimized Window Viewer, migrate to the desktop. You can now arrange them to suit your needs. Whenever you expand an icon and minimize it again, it will return to the same location. However, if you close and reopen a window, it will minimize to a system assigned location and you may have to reposition it to get it back to its old location.

If you run a large number of system applications--Communications Manager, TCP/IP, LAN Requester, etc.--you will have minimized windows associated with these tasks. Most of them will never be expanded. They are simply background tasks or IP demons used to communicate with other systems;



however, they take up space on your desktop. A good compromise is to leave all the system tasks in the Minimized Window Viewer and change the applications you use most to minimize to the desktop. To do this, open the Settings folder for each application,

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select the Window tab, as shown in Figure 4, and push the Minimize Window to Desktop button. Now the changed application will minimize to the desk top, while all unchanged applications will go to the Minimized Window Viewer.

Organizing Your Desktop: Step by Step

The default OS/2 system has many icons scattered around the desktop. They all have great functions behind them; however, it is easy to forget which functions are where. The problem is easy to solve by moving all other folders off the desktop and into the OS/2 System folder, which will be used as the anchor or starting point.

To make the desktop easier to organize, minimize any windows that are open, leaving only the icons visible. Locate the OS/2 System icon and drag it, using the right mouse button, to the lower right corner of the desktop. Next, double-click on it and adjust its window so it is about two and a half icons high and a little over half a screen wide. Then move it just above the OS/2 System icon.

Both the Master Help Index and the Start Here icons launch information applications. The best location for them is the Information folder. Drag each of them to the top of the Information icon and drop them in. Don't be concerned if they seem to disappear; they are inside the Information folder. Then drag both the Information and Templates icons into the OS/2 System-Icon View window.

Next, move the Minimized Window Viewer to the lower left corner of the screen. Expand it, by double clicking on it, and adjust its window to fit beside the OS/2 System-Icon View window. If you need more room, simply overlay part of the OS/2 System-Icon View window.

This leaves only the active icons on the desktop. Drag the Shredder icon to the bottom of the screen and drop it beside the Minimized Window Viewer icon. Then drag any Printer icons to the opposite side of the screen and drop them next to the OS/2 System icon. The last icon on the desktop is Drive A. It is a copy of the original, in the Drives folder. You probably won't use it enough to justify leaving it on the desktop. However, if you prefer to leave it on the desktop, drag it to the bottom of the screen next to your printer icons; otherwise, simply drop it on top of the Shredder and delete it.

Now that your desktop is cleaned up, you will want to arrange the windows for each of the folders, in the OS/2 System folder, so that they expand into the specific areas described in the main article. If you have any problems dragging icons or sizing windows, you might want to spend a few minutes going through the Tutorial located in the Information folder before you start.

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OS/2 Tech Tips

DOS FROM DRIVE A:

Jim Forney

Yes. Real DOS; almost any flavor, any version you prefer. Just stick a bootable floppy in drive A in the middle of an OS/2 session and go. But that does not begin to tell the story of this, one of the most powerful DOS support features found in OS/2—or, I should add, one of the most poorly documented.

Indeed, with a bootable floppy in your A drive, clicking on the DOS from the drive A icon does, in fact, boot up a real DOS session of virtually any ostensibly real-mode DOS there is: MS-DOS, IBM or even the now-pass DR DOS. This can be a real boon if, like the author, you happen to have one or more favorite DOS TSRs or other programs that are version-specific or otherwise incompatible with OS/2 2.x's more-or-less generic emulation of a DOS 5 environment, particularly since OS/2 lacks an equivalent for SETVER, the clever sometimes device driver, sometimes executable that comes with DOS (MS- or IBM DOS 5.0 and later) and which can fool some programs into thinking that they're running with another (generally older) DOS. It even works with an American Heritage dictionary and thesaurus that turns up its nose at running under DESQview in ordinary DOS.

Booting from a floppy in drive A is slow, however. And worse, it pretty much ties up your A drive for the session—and if you forget to remove it, you don't get OS/2 the next time you reboot, you just get plain old DOS from drive A.¹

OS/2 is pretty clever, though, and although it is very poorly documented, there is an easy way to have the benefits of booting real DOS from drive A while really booting from a hard disk image of a floppy instead. And that not only brings you up to booting at hard disk speed, but frees drive A for normal use.

CREATING A DISK IMAGE

The first step in creating an image OS/2 sees as a bootable "disk" is to create a genuine bootable DOS disk. At a bare minimum, this entails a disk to which you've transferred the system files: IO.SYS (IBMBIO.COM) and MSDOS.SYS (IBMDOS.COM)

plus COMMAND.COM (or 4DOS or other acceptable command interpreter). In addition, the disk must contain at least one other file: FSFILTER.SYS, found in the \OS2\MDOS directory. This file is critical, because without it you cannot access the OS/2 file system from DOS sessions. If you forget, you can copy this file to a floppy in drive B from an OS/2 window and then recopy from drive B to drive A (when drive A isn't tied up), but it's easier to do it up front.

Because of the importance of this file², the source disk then should contain at least a minimal CONFIG.SYS, one that at least contains the line:

```
DEVICE=FSFILTER.SYS
```

You can work out any other details later if you wish. For instance, although ostensibly OS/2 provides DOS 5 level support in MDOS, it is not a true DOS 5, I've found. So, with the exception of certain files you're likely to need that are unique to MDOS and specific to use with drive A DOS sessions (such as FSFILTER.SYS), you either want to have whatever DOS externals you use included on your source disk, or you want to have them at least available on your hard disk and available from the path. Those in MDOS, although most have names identical to ordinary DOS commands, are not compatible with any DOS I've tried (including IBM 5.02 and 6.00 beta—Ed.)

With this (bootable) source disk in a floppy drive (and here it doesn't have to be drive A) you run an OS/2 utility called VMDISK. The syntax goes like this:

```
VMDISK [source drive] d:[path]target filename.extension
```

Note: you only refer to the source in terms of what drive it's in, because the image you create will be an image of the entire disk. You do, however, have to specify a filename for your image—typically something self-explanatory, like IBMDOS-5.VMB—as well as a drive and path.

VMDISK does something akin to running

DOS From Drive A:

DISKCOPY except, unlike DISKCOPY, it does not insist on copying to absolute sectors. Otherwise, in principle, it's much the same; however, the image file contains 2 copies of the FAT, a root directory and everything that's on the disk (even recoverable deleted files), all mirror images of those found on the source disk.

Having created the image as a hard disk file, you then need to open the settings notebook (click the right button on the DOS from the drive A icon) and go to page two and open the DOS Settings. Going down the list, you'll find one labeled "DOS STARTUP DRIVE".

You click on that and enter the drive, path and name of your image file, save it and, from that moment, clicking on the DOS from the drive A icon boots your image file, wherever it may be. To clean up the installation, you can go to the last page of the settings notebook and change the name from "DOS in drive A" to something more appropriate, like "IBM DOS 5," and maybe even change the ugly default icon if you like.

WHICH DISK IS REAL? OR DOES IT REALLY MATTER?

At this point, it doesn't matter what is real and what is just an image. OS/2 treats the image like a real disk, and when it is booted, you can create files, edit files or copy files to the image just as if it really

were a disk. That's why I said it didn't matter if you had CONFIG.SYS and AUTOEXEC.BAT initially.

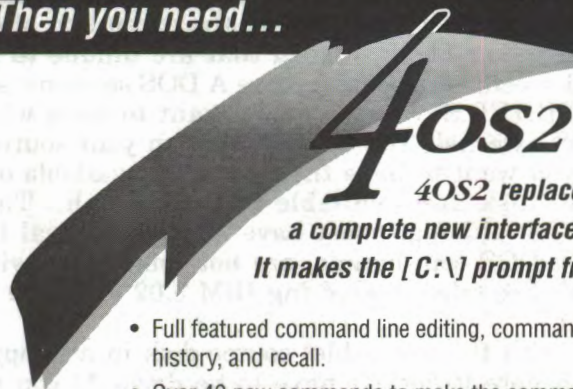
Once created, disk image files are remarkably portable, I might add. A friend of mine in Texas sent me one to play with recently. Not the source disk to create an image of—rather, an image file he'd copied from his hard disk to a floppy, which I then copied to my hard disk—no EA's, no nonsense, just a plain old copy—and it worked just fine.

DOS BEYOND 640K

There are some major differences between using DOS from drive A, running under OS/2, and the real world mode DOS comes from, though. This is particularly true if any of the applications that you want to run (or DOS-specific device drivers, TSRs, etc.) either need or would benefit from memory beyond 640K—extended, expanded, UMBs or the HMA. These are all available—just as they are with the OS/2 DOS emulation—but you have to access them a little differently. No QEMM386 or 386MAX here. OS/2 simply will not tolerate it.

First things first, though. I doubt that there's anyone reading this who's not familiar with booting DOS from drive A on a plain old ordinary DOS machine. That part is just the same in OS/2, except instead of starting cold (or with the old 3-key salute) you simply click the icon from within OS/2.

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The bootable floppy you begin with can, like any bootable DOS floppy, have its own CONFIG.SYS and AUTOEXEC.BAT, and can load files either from your hard disk or the files it brings along. Basically, once FSFILTER.SYS is installed, your drive A DOS has access to whatever system resources any other sessions you are running have available to them. For instance, if you have a Stacker drive and have the OS/2 Stacker driver installed, your drive A real DOS session gets the benefit without having to load a separate DOS driver.³

With MS- or IBM- DOS 5.0 or later, you can use DOS=HIGH,UMB in the floppy's CONFIG.SYS, and OS/2 will load DOS for that session in the HMA and be receptive to the use of upper memory for device drivers and for TSRs using DEVICEHIGH=[driver] or LH [TSR] commands. Of course, you can't have either of these, let alone have access to extended or expanded memory for DOS, without some form of interface or "memory manager," as we are used to calling things like that in DOS.

For DOS in OS/2, forget the term "memory manager" and stick with "interface." OS/2 is the memory manager for DOS sessions, Windows sessions and OS/2 sessions. What you have to do in DOS from drive A is to interface with services provided by the OS/2 kernel. It is important that you understand the

distinction, because the names you're going to see can be misleading: HIMEM.SYS and EMM386.SYS (SYS, not EXE here). But look at the sizes of this duo in the MDOS subdirectory of OS/2:

Bytes	DOS	Equivalent
HIMEM.SYS	435	14,256
EMM386.SYS	505	115,806

While used the same way as in DOS—DEVICE=d:[path]HIMEM.SYS, etc.—these tiny stubs in fact are only interfaces with the kernel. You can take your real DOS with you, but you cannot take your memory manager. Not HIMEM.SYS or QEMM386 or 386MAX or anything else. You must use OS/2's similarly named stubs instead. This is about the only difference you've got to be aware of, though. Once these stubs are loaded from the floppy (or image file) CONFIG.SYS, you can use DEVICEHIGH or LH just as with DOS 5.

Once you have installed the FSFILTER driver from the CONFIG.SYS to enable access to the OS/2 file system, you can path to any other files you may need to load from MDOS. As a matter of preference, I copy all of the files my real DOS sessions will need while booting to my source disk. This is optional, however—with the exception of FSFILTER.SYS, as noted earlier.

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Typically, the configuration files that you'll wind up with for your real DOS sessions will look something like this

```
Device=fsfilter.sys @echo off
Device=himem.sys
path c:\os2\mdos;d:\dos\batch;d:\dos\utility
Device=emm386.sys
prompt IBM DOS 5.02$_Running under OS/2$_p$_
DOS=HIGH,UMB
device=setver.exe
Files=30
Lastdrive=Z
```

If you do not use IBM- or MS-DOS 6, you will not, of course, have the multiple boot configuration option supported by these releases available. As an aside, however, I note that CHOICE.COM, the new utility that comes with both of these new DOSes, is not version sensitive and runs beautifully with DOS 5 (and even with the DOS emulation OS/2 provides—I copied it to my MDOS directory). If you have a copy handy, you can use CHOICE, which gives you the greater part of the functionality you'll want, or likely need, when running under OS/2, anyway.

A MEGABYTE OR MORE OF WASTED SPACE

In this day of monster hard disks, we often tend to get a little careless in the way we use them—until we suddenly outgrow them. For anyone booting real MS-DOS sessions under OS/2 (for those few stubborn DOS apps that require them), there's a simple way to save as much as a megabyte or more when creating a mirror image of a bootable DOS disk on your hard disk to boot from.

The only requirement when using VMDISK to save a mirror image file is that the source disk be bootable. The size or capacity of the source disk does not matter. With this in mind, I reformatted an old 360K 5-inch disk as a 180K disk—plenty of room for the MS-DOS 5 system files, a simple CONFIG.SYS and AUTOEXEC.BAT along with the OS/2 files FSFILTER.SYS and the OS/2 (MDOS) versions of HIMEM.SYS and EMM386.SYS, with roughly 15K to spare.

The image file created from this disk (184,328 bytes) replaced an earlier version done using a 1.44 Mb disk for a saving of over 1.2 Mb with no loss of functionality. Once created, of course, the size of the image file cannot be stretched, and if you should ever need a larger one, you'll have to make one from a bigger floppy disk. It is unlikely that you'll ever need to, though.

TO SUM IT UP

Whether you actually boot real DOS from drive A or from an image file, this poorly documented part of OS/2 can be an extremely useful tool to almost anyone making the transition from DOS. There are some things you cannot do with DOS from drive A—image or otherwise. You cannot, for example, run a multitasker such as DESQview, nor Windows 3x sessions. But who needs to, given OS/2's far more seamless multitasking and the seemingly flawless Windows 3.1 support in OS/2 2.1. It does provide a bridge, however, when you need it.

³This does not apply to substituted or assigned drives which are local and recognized only on the virtual machine(s) on which they are specifically created.

²Along with other changes in OS/2 2.1, FSFILTER.SYS was changed in such a way that 2.0 image files were not compatible with this new release. You will want to hang on to your source disk, so that if need be you can copy the latest version to it should the next release again behave this way.

¹The OS/2 boot manager, if used, ignores a floppy in drive A the first time you reboot, defaulting to it only if for some reason the normal boot cycle is interrupted before completion.

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REVIEW!

ICON Express

Ron Beauchemin

One of the early complaints from users of OS/2 2.x was the lack of an icon management utility. Since then, a few companies have developed such tools, including IconEase from New Freedom Data Center, the focus of an early review in OS/2 Monthly. Another tool to handle icon management is American Computer Technology's "Icon Express".

Icon Express allows full drag-and-drop assignment of icons. The 1,000 icons included with the program (actually, it's 500 icons—one set in color, one in black and white) are displayed through OS/2's notebook control.

These icons are non-application specific—you will not find Lotus 123 icons or Quattro Pro icons supplied with the utility. Instead, the supplied icons are generic: a blouse, calculator and calendar. Some users might find this a disadvantage, but Icon Express does give you the flexibility to add your own icons and organize them in whatever manner you wish. For example, I used the 3300 icons that I uploaded to the CompuServe OS2USER forum library (OS2IC1.ZIP, OS2IC2.ZIP & OS2IC3.ZIP). My icon library was broken down alphabetically with the icons associated to the corresponding letter of the alphabet—each letter in its own zip file.

In order to utilize my icon library in Icon Express, I created a directory on the hard drive called OS2ICONS. After creating a subdirectory under OS2ICONS for each letter of the alphabet and the numbers zero through nine, I unzipped each of the lettered and numbered icon ZIP files into its corresponding subdirectory. Once this task was completed, I could begin to make use of the icons within Icon Express.

Icon Express allows the user to customize the icon library by clicking on the setup push button located on the bottom of the Icon Express notebook. The setup is accomplished by use of a list box, which contains four columns. The first column is unused, while the second column contains the page heading. The page heading is the name the user wishes to appear on the note book tab. The third and fourth columns contain the drive and directory name in which the icons are stored. In my example, the third column would contain D and the fourth would contain \OS2ICONS\A. The heading column could contain

"A Icons" or whatever name I might choose. This same process would be repeated for each letter of the alphabet and for each of the ten numbers. Once the process is completed, the user closes the setup dialog box and is returned to the Icon Express notebook.

In order to assign an icon to a program object, the user simply drags the program object and drops it onto the desired icon located on the Icon Express notebook page. The notebook page is simply a list box that displays the actual icon images. Although IBM allows drag and drop assignment of icons within OS/2 2.1, it is not nearly as convenient as Icon Express's handling of that task. In order to assign the icon to a program object using OS/2 2.1, the user must go through several mouse movements to assign the icon. Icon Express only requires one to perform the same function.

Icon Express shows both pluses and minuses when compared to the IconEase product. On the positive side, the actual choice and assignment of icons is somewhat easier in Icon Express than it is with IconEase. With Icon Express, the user may view several of the actual icon images at once, while with IconEase the user can only view one icon at a time after selecting its name from the list box. Also, with IconEase the assignment operation actually takes four mouse movements, as opposed to one for Icon Express.

Icon Express could be improved by incorporating some of the features in IconEase. The icons within IconEase are stored in a compressed manner within an icon database. This results in a significant savings in disk space (IconEase stores my 3300 icon library in 942K, versus 6.7 megabytes for Icon Express). IconEase also provides the user with 3300 icons with the product along with the ability to add your own icons to the compressed database.

American Computer Technology has provided the user with an easy-to-use icon management tool. Check with American Computer Technology regarding price and availability.

American Computer Technology can be reached by telephone by calling either 1-800- ACT-7185 or 407-875-1188. The FAX number is 407-875-2058.

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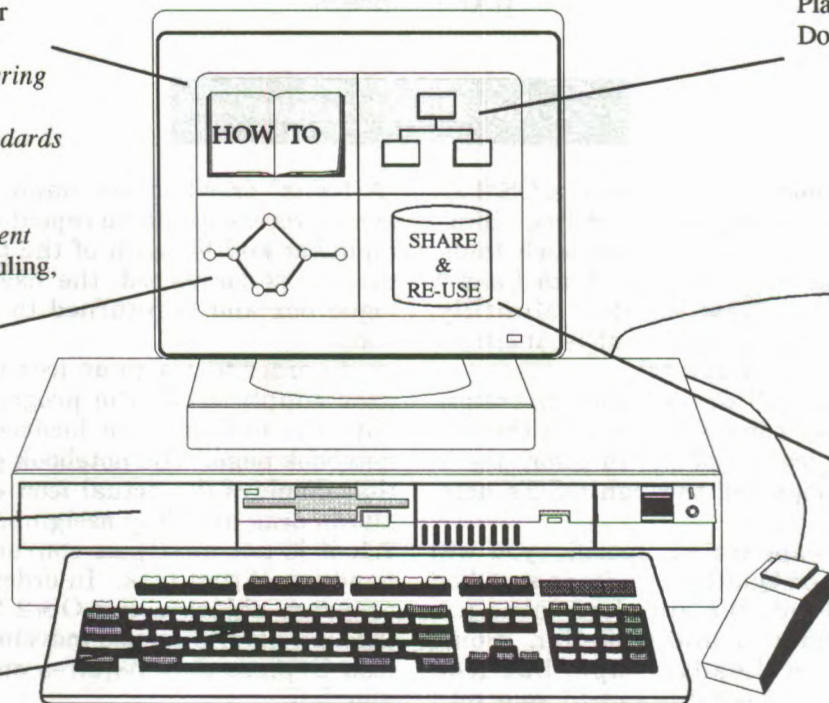
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OS/2 2.1 Multimedia

Inside IBM

Maria Ingold

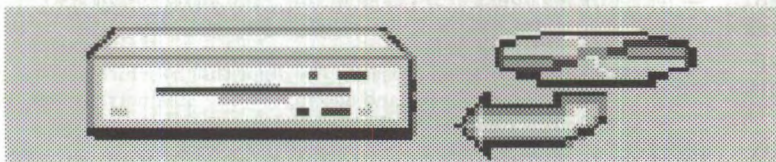
Imagine a world where personal computers greet their users with the blare of trumpets, let them look at a sound and manipulate it, play a music CD without ever turning on the stereo, and receive video help on an application without adding any extra hardware. World of the future? No, all these capabilities are provided today by OS/2¹ 2.1 and its built-in multimedia support, previously the separate Multimedia Presentation Manager/2 (MPPM/2) product, now the standard multimedia architecture for OS/2 2.1. OS/2 2.1 Multimedia takes full advantage of OS/2 2.1, includes both audio and video applications, and has an application programming interface which provides hardware independence and is extensible for the future.

Provided with OS/2 2.1 Multimedia are a set of audio and video applications which serve two purposes: One, they provide immediate multimedia functionality to the user of OS/2 2.1, and two, they provide examples of what can be accomplished using the MPPM/2 architecture as a programming base.

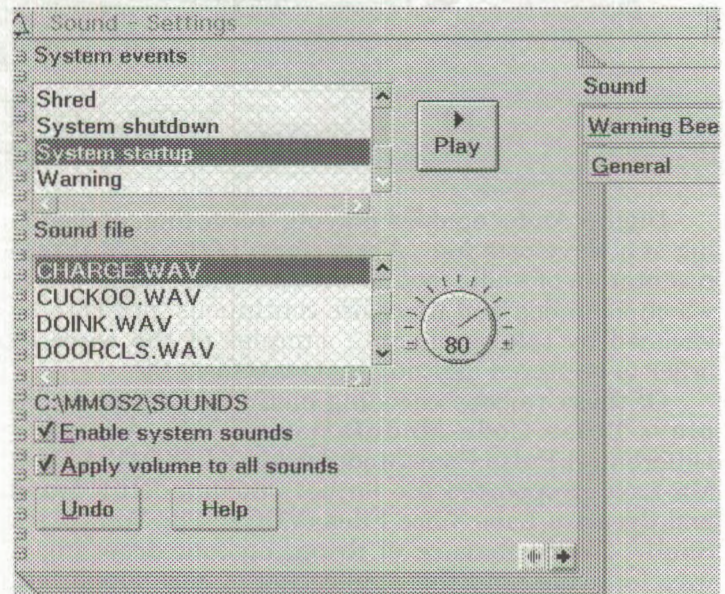
OS/2 2.1 Multimedia Audio

The OS/2 2.1 Multimedia base audio applications are composed of:

- CD Player
- Digital Audio Player/Recorder/Editor
- Macros for Lotus and Excel
- MIDI Player
- System Sounds

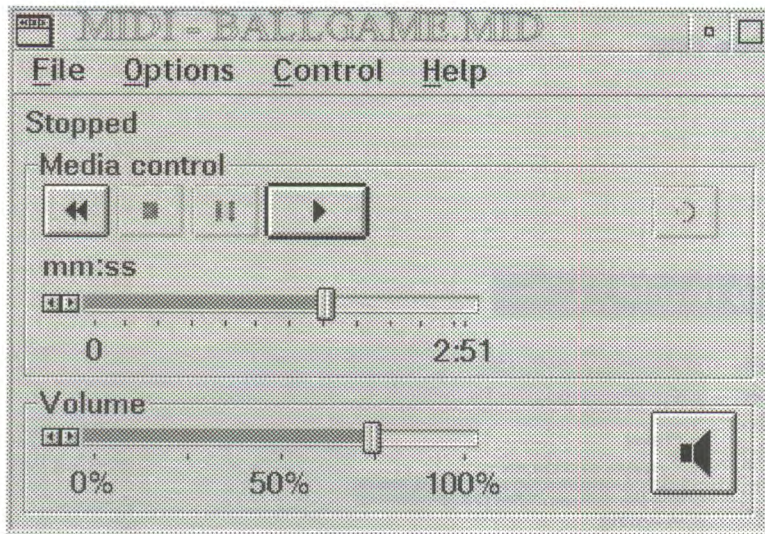


The CD Player (with the music CD of your choice)



provides capabilities similar to those on a home stereo, and works with all OS/2 2.1 supported CD ROM drives. The standard functions of playing, cueing, ejecting, skipping tracks, displaying current track and time into track, as well as the more advanced functions of editing tracks out of a play sequence, automatic play, repeat, and shuffle are present. In addition to these normal functions, the software CD Player provides the ability to catalog CD titles and display that title whenever the CD is loaded. There is also a software eject button, and if a CD is ejected, a graphic appears instructing the user to insert a CD. Furthermore, digital transfer of data from the CD ROM through a sound card is possible if the card supports CD quality, i.e. 16-bit stereo at 44.1 kHz, and the CD-ROM is able to stream digital data. This enables the CD ROM to use the Digital Signal Processor (DSP) on the card, as it may be better than its own internal one. The CD audio output is then piped out through the card's speaker jack, thus maintaining a higher quality of sound.

Multi-Media



Digital Audio enables playing, recording, and editing of a waveform file. A waveform is the digital representation of audio (sound waves). This sound wave, which is analog and therefore continuous, needs to be encoded by taking discrete samples of the wave in order to be stored digitally in a waveform file.

Of these various encoding methods, Digital Audio plays Pulse Code Modulation (PCM), Adaptive Differential Pulse Code Modulation (ADPCM), A-Law, Mu-Law. Supported file formats include RIFF Wave and Creative Labs Voice Files (VOC). The Workplace Shell¹ (WPS) feature of dragging and dropping a waveform file onto the application is also supported. RIFF Wave PCM files are able to be displayed graphically, and hence, in addition to playing or recording into the whole file, selected ranges of the file can be played, recorded into, or edited.

Digital Audio supports recording in either stereo or mono, at a sampling rate of 11.025 kilohertz (kHz), 22.05 kHz, or 44.1 kHz (voice, music, and CD quality respectively), and with a sampling precision of 8-or 16-bit. If the sound card does not support a particular capability, the option to do this in Digital Audio will not be available. Since some sound cards do not provide all the aforementioned capabilities, Digital Audio enables audio quality conversions for PCM files by selecting the entire file, copying it into the clipboard, changing the aforementioned settings, and pasting the original into a new file.

As PCM files are able to be displayed graphically, cut, copy, and paste of an entire file, or selected regions, are done much like an editor. In addition to these features, special effects such as mix from file or clipboard, volume change, speed change (comparable to monster and chipmunk), fade, reverb, reverse, and

echo can be applied to the whole file or part of it.

The Lotus and Excel Macros add audio enablement to a spreadsheet. These macros are available for 16-bit versions of both as well as for the 32-bit version of Lotus. By adding this audio capability, numeric information can be clarified by recording comments into the cells, which can then be played back. When the macro is started, it adds an "Audio" option to the menu bar, from which play and record can be selected. The record option brings up a small graphical recorder, and audio can be added from the microphone, using the record button, or pasted in from the clipboard by selecting paste from the system menu pull-down. The mini recorder is useful for quick comments, while pasting is advantageous because the Digital Audio application can be used to record the file, and then to add effects to it.

The MIDI player allows playback of MIDI (Musical Instrument Digital Interface) files from a selected position. The MIDI player is actually a generic media player that can dynamically change its device type depending on the type of file that is loaded. The device type determines if record and other options are enabled.

System Sounds allow waveform files to be associated to different system events. This is both fun, as a favorite song clip could be played on startup, and educational, where audio help can be associated to actions, such as the shredder announcing that "This file will be obliterated if it is dropped here." System Sounds also recognizes files created using the Tunes Editor, which outputs DOS beeps at the appropriate frequency. Using this enables system sounds to play through the computer's speaker, even if there is no sound card.

With the exception of the Tune Editor, the one thing that all these audio applications have in com-

Glossary

ACPA: IBM Audio Capture Play Back Adapter.

ADPCM: Adaptive Differential Pulse Code Modulation.

AVI/AVI: A file format which acts like a wrapper around data chunks. These chunks are audio and video. The audio format is a waveform and the video format is a given CODEC, like Ultimotion or Indeo.

CODE: CCompressor/Decompressor. The algorithm by which an image is compressed and decompressed. This may be done in hardware and/or software.

DSP: Digital Signal Processor. FPS/Frames per second.

ISA: Industry Standard Architecture. Interleaving in this context, the combining and synchronizing of audio and video data.

KBS: Kilobytes per second.

kHz: Kilohertz. Thousands of cycles per second.

M-Audio: See: ACPA.

MCA: Micro-Channel Architecture.

mon is that they need to be played through an audio card in order to be heard. The three boards supported by MMPM/2 are the Creative Labs Sound Blaster² series (SB), the IBM Audio Capture and Playback Adapter¹ (ACPA or M-Audio), and the Media Vision Pro Audio Spectrum 16³ (PAS 16).

Additionally, multimedia-enabled REXX provides command line or batch file support for playing and recording sound and playing movie files. As an example, a useful application of this would be adding the playback of an audio clip to the end of a compile batch file to let the programmer know when the compile is done.

OS/2 2.1 Multimedia Video

The OS/2 2.1 Multimedia Applications which provide video support are: Digital Video Player, and The Video In Recorder¹; and Ultimedia Builder/2¹, workshop products that supports Ultimotion and Indeo.

The Digital Video Player, available as part of the base product, uses software—only decompression algorithms; therefore, no additional video hardware is necessary to play a movie. This means that anyone using a machine with OS/2 2.1 installed has the capability to play video. The Digital Video Player uses the generic media player interface as a control panel and displays the movie in a separate playback window. This window's system menu contains several additional video—specific menu options. One of these, "Movie Info," contains information about the file name, compression type, frame size, frame rate, data rate, and running time. Additionally, Double Size and Half Size are available on most SVGA and XGA¹ systems. These options would make a 320x240 movie, for example, play at 640x480 or 160x120 by adding and removing pixels respectively.

MIDI: Musical Instrument Digital Interface.

MMPM/2: Multimedia Presentation Manager/2

pels: Also referred to as pixels. Both acronyms were derived from the words "picture element." This is the smallest element on the display which can be independently given both color and intensity.

PAS: Pro Audio Spectrum.

PCM: Pulse Code Modulation.

RIFF: Resource interchange file format.

SVGA: Super Video Graphics Adapter/Array.

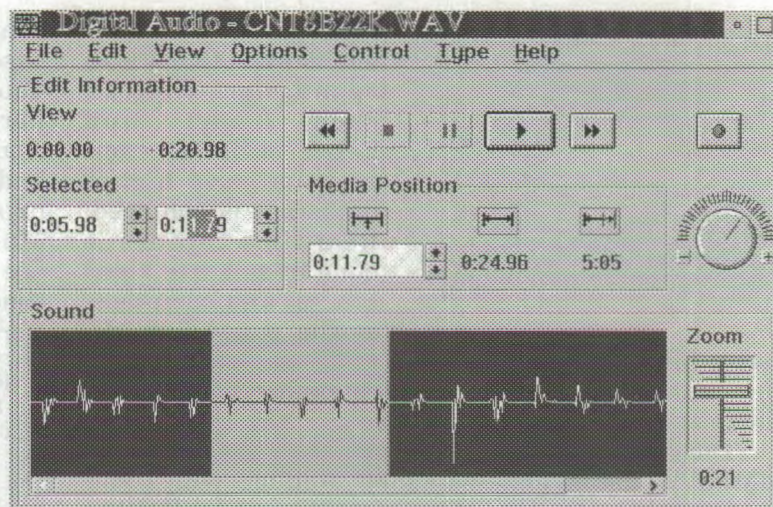
S-VIA: Jovian Super Video Input Adapter.

VCA: IBM Video Capture Adapter.

waveform: A waveform is the digital representation of audio (sound waves)

WPS: Workplace Shell

XGA: Extended Graphics Array adapter



OS/2 2.1 uses the AVI file format as its standard for video. AVI is a file format that contains compressed video or animation data. The compression shows the name of the CODEC (Compressor/Decompressor) used to record the movie. Ultimotion¹ and Indeo⁴, amongst others, are CODECs (Compressor/Decompressor) that come with OS/2 2.1.

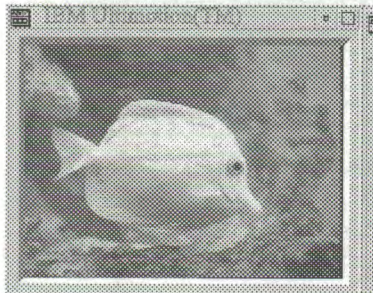
The frame size is the size at which the movie was recorded. It is given as width times height in pels. The maximum frame size is hardware dependent, for example, 640x480 pels. The frame is then recorded at a ratio of this size, say 2:1 or 320x240 pels. It is this value which is the frame size.

The frame rate is the number of frames per second (FPS) at which the movie was recorded. When recording, although the card may be set up to grab an image at up to 30 FPS, the compressed image output can be recorded at another rate, for example, 12 or 15 FPS. This value is the given frame rate. The actual rate of playback on a system depends, however, on the processing capabilities of the system, as well as the complexity of the CODEC used to create the movie.

Data rate is given as the maximum number of kilobytes (KB) used by a second of the movie, and hence is given in KBS. This data rate is composed of the peak amount of KBS utilized by both audio and video. For example, a data rate of 100 KBS may consist of 22 KBS of audio and 78 KBS of video. An average Ultimotion movie of 320x240 pels x 15 FPS at 64K colors takes up 9 megabytes (MB) per minute, or 150 KBS, the same data rate needed for single speed CD ROMs.

Movies can be recorded in two ways: frame—step or real-time. Frame-step capture requires stepping through the movie frame by frame, as from a

OS/2 2.1 Multimedia



laserdisk. This enables the CODEC to spend more time on each frame, and hence, a better compression, and higher data rate is achieved. Real-time capture is done from a live video source, and compresses the image immedi-

ately. Since less time is spent analyzing each image, the frame size is smaller in order to achieve single-speed CD ROM data rates.

The capture capability is provided in a separate MMPM/2-based video workshop product, which will be available shortly. The Video Recorder/Editor allows the specification of the CODEC, frame size, frame rate, data rate, and recording method (real-time or frame-step). Furthermore, the video image may be adjusted in brightness, color, contrast, and tint. As an editor, still image capture into a bitmap and cut, copy, and past of video are possible. Also provided is the ability to make movies from raw video files and bitmaps.

Since the actual video compression is done in software, only a simple "frame-grabber" card is necessary to capture the image. The four video capture devices that are currently supported are the Creative Labs Video Blaster², the IBM Video Capture Adapter/A (VCA)¹, the Jovian Super Video Input Adapter (SuperVIA or S-VIA)⁵, and the Sigma Designs WinMovie⁶/Jovian QuickVIA. The card's attributes are listed in the following chart. The Video Blaster is the only card which supports video overlay, and uses YUV411 color instead of RGB16, which is used by the other cards. They range in price from \$200 to \$600 based on their capabilities and their manufacturers.

In addition to the Video Recorder/Editor, an AVI File Utility is included in video workshop products. This utility, among other things, provides the ability to browse the AVI header information, and to merge, split, interleaf and skew audio and video data.

Applying It

OS/2 2.1 Multimedia, with its ability to fully utilize the OS/2 2.1 architecture, and its support of Workplace Shell functions, such as drag and drop, provides the OS/2 user with the immediate ability to extend his or her everyday operations into the realm of multimedia. To go beyond this, Ultimedia Builder/2¹, a MMPM/2-based product, allows the integration of audio, image and video to create pre-

sentations. As MMPM/2 provides the multimedia base architecture for other applications, the OS/2 2.1 Toolkit provides the necessary header files and libraries to program additional applications or extensions with MMPM/2 architecture. Sample programs and their associated C code provide examples for the programmer to follow. Not only is OS/2 2.1 Multimedia providing multimedia applications for use today, MMPM/2 is ensuring the extension of multimedia into the future.

Maria Ingold, IBM Corp., Personal Systems Programming Division, PO Box 1328, Internal Zip 1508, Boca Raton, FL 33429. Ingold has been a programmer and resident artist for MMPM/2 and is now programming for Workplace/OS. She worked on the Multimedia Data Converter and Digital Audio/Player/Recorder "applets." She received her B.S. in computer science with a studio art minor from the University of New Mexico. Part of her studies were done at the University of Essex, U.K.

Bibliography:

IBM Corporation, *IBM Multimedia Presentation Manager/2 Application Programming Guide*, Release 1.1, 1993.

⁶Trademark of Sigma Designs

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Reality Check

Installing IRQ's

Fabian Pascal

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Other than its object-oriented graphical user interface (the WorkPlace Shell) and flat memory model (allowing access to gigabytes of memory) the other major advantage claimed for OS/2 is its 32-bit, multithreaded, truly multitasking operation. But while OS/2 runs on most hardware, and multitasks most DOS and Windows software, taking full advantage of these capabilities may require some boosting.

Interrupt Levels

The PC architecture requires every hardware device to use an interrupt, or IRQ, to communicate with the operating system. For simplicity, think of IRQs as channels of communication that devices such as hard and floppy disk drives, printers (parallel devices), and fax/modems (serial devices) must have available to operate.

OS/2 can recognize two parallel ports (LPT1, LPT2), and up to four serial ports (COM1-COM4). ISA and EISA systems provide seven low (IRQ0-IRQ7), and nine high (IRQ8-IRQ15) IRQs, and OS/2 sets them by default as follows:

Port	I/O Address	IRQ
LPT1	3BC	7 <<— required
LPT2	378	5 <<— required
COM1	3F8	4
COM2	2F8	3
COM3	3E8	5 <<— if not used by LPT
COM4	2E8	10

The average system comes with an I/O card (e.g., IDE adapter) which usually provides two serial ports and one parallel port. Thus, default IRQ usage is something like:

IRQ USE:

IRQ	USE:
0	System Timer
1	Keyboard
2	[Cascade]
3	COM2 <<— serial port 2 t 2
4	COM1 <<— serial port 1 t 1
5	Available
6	Floppy Disk
7	LPT1 <<— printer ter
8	Clock/Calendar
9	VGA, (Active)
10	Available
11	Available
12	Available
13	80486 FPU
14	Hard Disk
15	Available

Most I/O adapters "see" only the seven low interrupts and thus have no access to IRQ8-IRQ15. Newer systems offer ports on board, and it is then a matter of how flexible their IRQ configuration is.

Multitasking and Printing

Under OS/2, more than one task can print concurrently on different printers, which comes in handy when there are many print jobs, particularly long ones involving graphics. A second printer, however, requires a second parallel port. With one parallel port you still can use two printers, but not concurrently, and you must manually switch between them, which means you don't take advantage of multitasking. Manual switches are somewhat annoying, especially if you keep forgetting to switch printers prior to sending output. Also, for laser printers you need an electronic switch, as some mechanical ones may either damage the printer, or OS/2 may not work properly with them. The cheapest ones are in the \$50-100 range.

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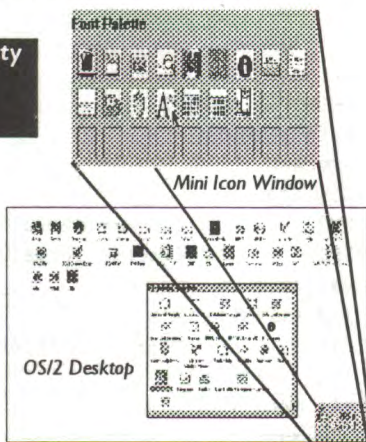
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One possibility is to get an additional I/O card, which is inexpensive (around \$15). OS/2 requires the second parallel device, LPT2, to use IRQ5 and, if it is available, you're all set. But if it is used by another device, you face an interrupt conflict. For example, the ATI Graphics Ultra card (which is popular with OS/2 users because it supports the high resolution 8514/A video mode built into OS/2 and has a graphics processor to which processing can be offloaded, thus accelerating multitasking performance) comes with a bus mouse that uses IRQ5 by default. The ATI installation software allows reconfiguring the mouse to use other low IRQs, but with a second parallel using IRQ5, none of the seven is available.

If you already have an I/O card, using a second system slot for a second one, particularly a 32-bit EISA slot, just for a parallel port is wasteful. Moreover, for EISA systems, it makes more sense to use the ATI's newer, 32-bit version of the Graphics Ultra, which does not have a bus mouse (see below).

Another possibility would be for a second parallel device, LPT2, to share an interrupt level — here, IRQ7 — with LPT1. But the ISA bus does not support interrupt sharing. The EISA bus permits it, but ISA cards cannot take advantage of it, and there are no EISA-specific I/O cards. Nevertheless, OS/2 allows print jobs to be sent to either LPT device when the other is idle, even if both use IRQ7. It can even use a time-slicing trick to switch between jobs sent to both LPTs simultaneously. This solution is free, but will affect performance, and depends on the quality of the parallel port implementation on the I/O card.

Multitasking and Communication

DOS and Windows fax software can run as background tasks, but do not take advantage of OS/2's multithreading capability. With the average fax hardware, the background processing is done by the system's CPU, which must handle multiple foreground tasks too. This can tax performance for all tasks.

The Intel SatisFAXtion/400 internal fax modem does take advantage of OS/2's capabilities. It is currently the only product with a built-in 8088 processor, to which fax processing is offloaded, releasing the system CPU to other tasks. It is directly supported by FaxWorks, 32-bit multithreaded fax software for OS/2. The up to 14,400 baud fax modem uses the high IRQ10, which is usually available. The 14,400 modem implements its own serial port with a data buffer similar to that of the 16550 UART. It can be set as any of the four COM ports, but for all practical purposes the options for IRQs are limited to only IRQ3 or IRQ4.

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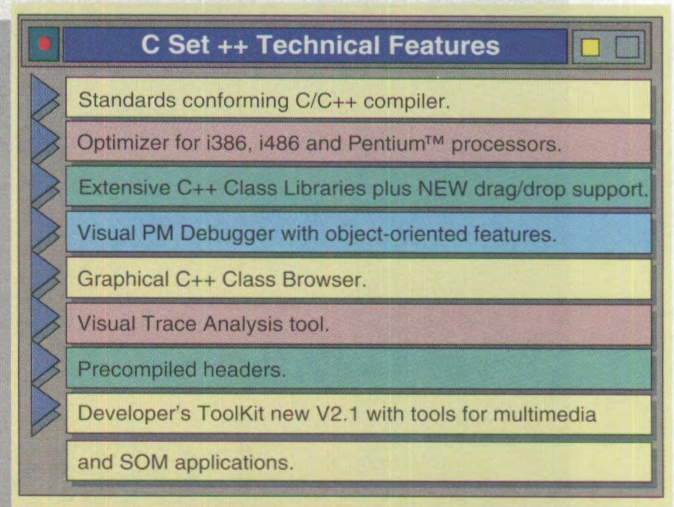
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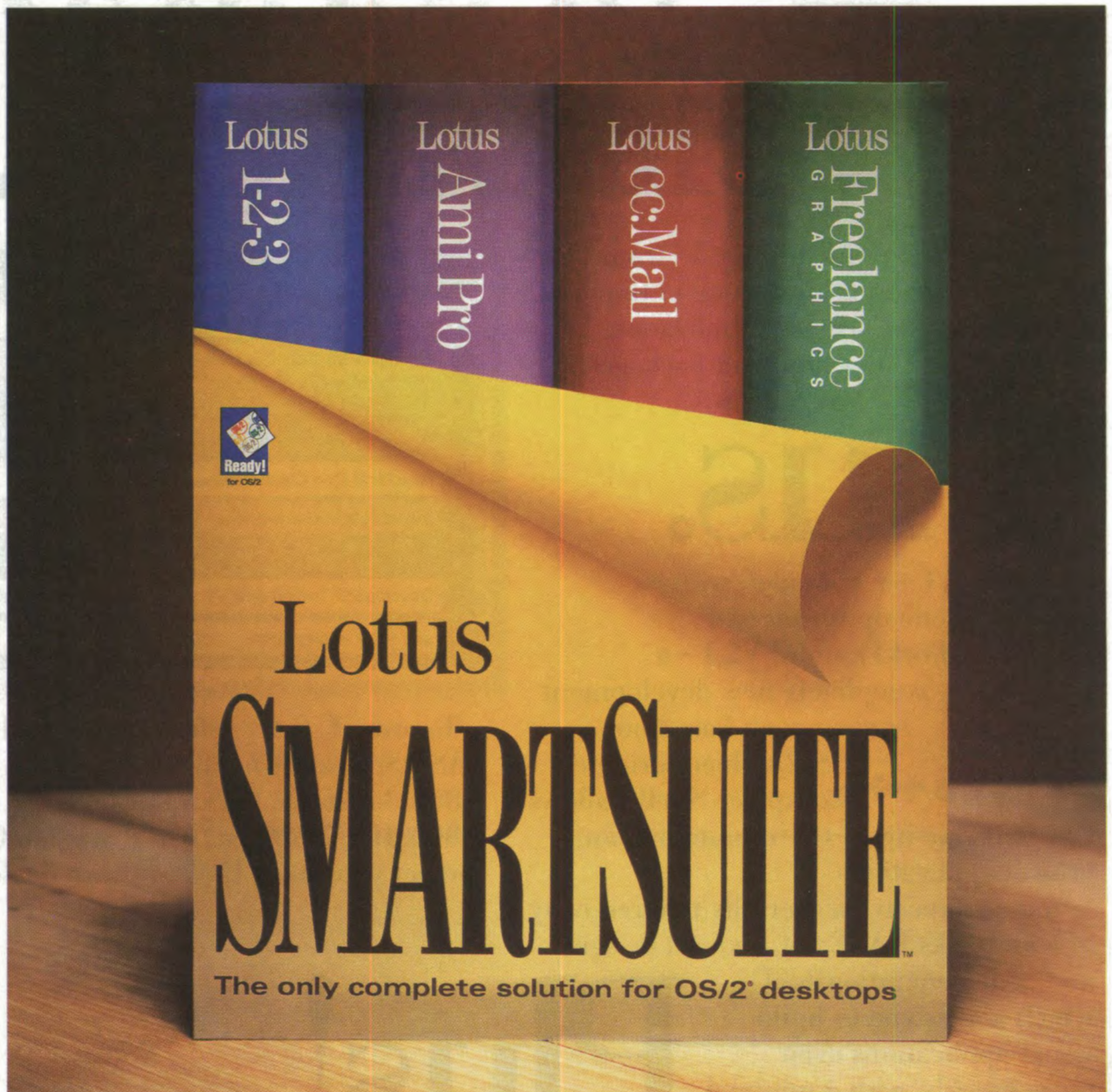
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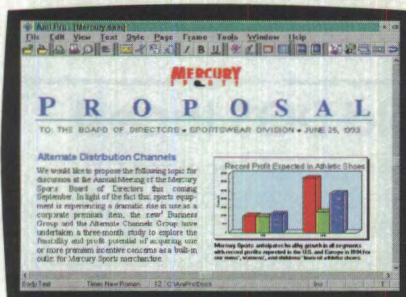
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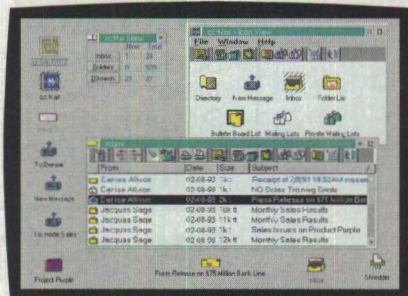
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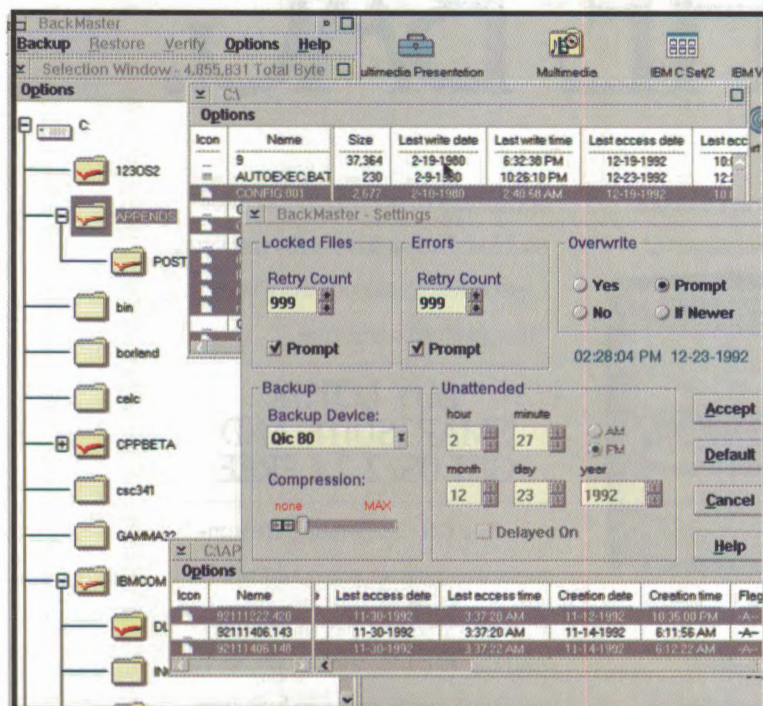
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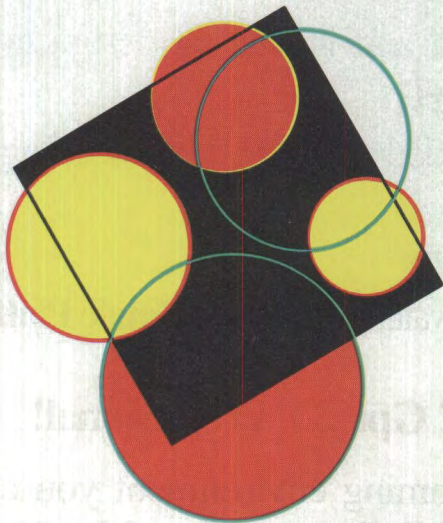
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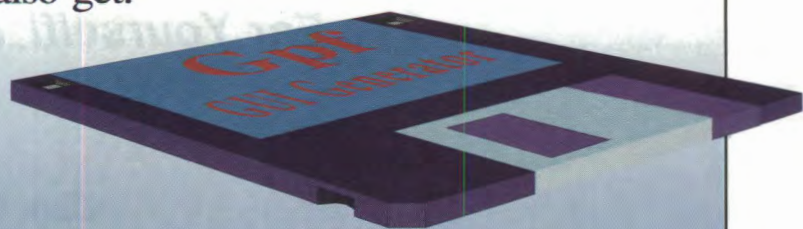
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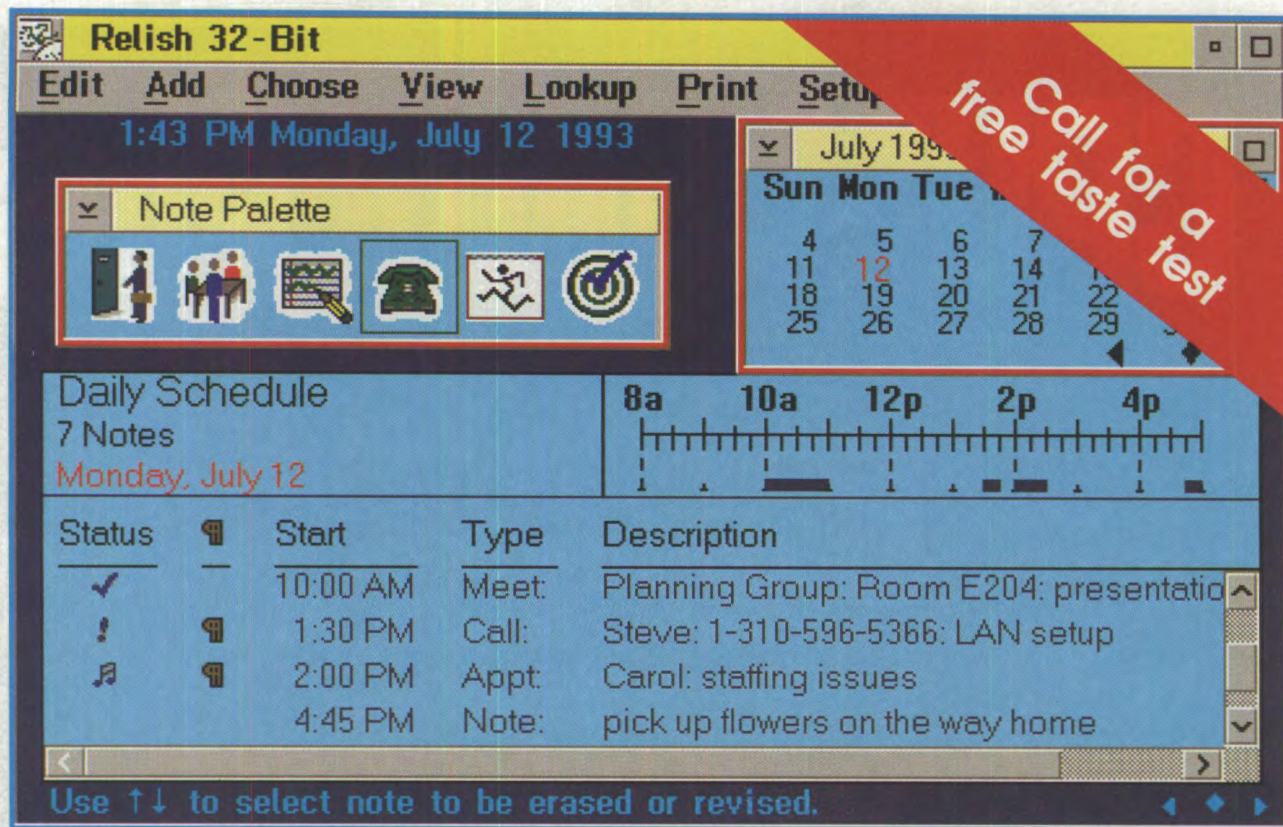
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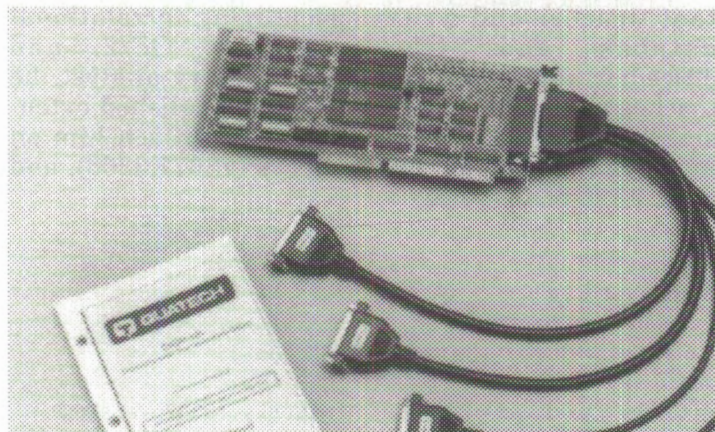
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ATI's newer Graphics Ultra Pro video card is highly recommended for OS/2, particularly when the 32-bit drivers will become available later this year. It uses the address of COM4, in which case only COM1, COM2 and COM3 are available.

Now, if you have a serial mouse, you can connect it to serial port COM1 using IRQ4, configure the SatisFAXtion as COM2 using IRQ3 and take good advantage of OS/2 with two printers using the following setup:

IRQ	USAGE
0	System Timer
1	Keyboard
2	[Cascade]
3	COM2 <<— SatisFAXtion data modem
4	COM1 <<— serial mouse
5	LPT2 <<— printer 2
6	Floppy Disk
7	LPT1 <<— printer 1

But suppose you are upgrading from another fax-modem, and want to keep it operational until the SatisFAXtion is installed and works smoothly (highly recommended!). Furthermore, with an additional modem you can even multitask communication sessions, e.g. accessing CompuServe and MCI Mail concurrently! To this end, you need a third serial port, but all low IRQs are used and they are not sharable.



16-bit I/O Adapters

The most logical solution is to gain access to the high interrupt levels, IRQ8-IRQ15, several of which, depending on what other hardware you are using, are available. The average I/O adapter does not permit this because it is usually an 8-bit card. 16-bit I/O

adapters can access the high IRQs, but, for some reason, they have been slow to materialize. This is changing with the increased prominence of multitasking environments.

DSDP-100

It provides, as its name indicates, two parallel and two serial ports. As a 16-bit adapter, the DSDP-100's serial ports can be configured to use available interrupts from IRQ2 to IRQ15. To avoid addressing conflicts that may be caused by other hardware, the base I/O address of each port is also configurable. The factory default configuration is:

PORT	ADDRESS	IRQ	ENABLED?
Serial A	3F8	4	Yes
Serial B	2F8	3	Yes
Parallel A	378	7	Yes
Parallel B	278	5	Yes

The parallel port setup is compatible with the ISA/EISA standard and OS/2 requirements, and needs no change. Depending on your hardware, even the serial port default setup may be acceptable as is, e.g. if you opt for an external faxmodem, which you



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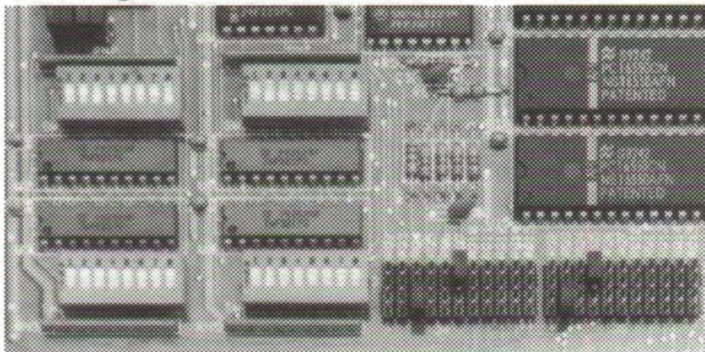
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Reality Check

connect to serial port B, instead of the SatisFAXtion.

If you go for the internal SatisFAXtion, serial port A can remain at the default setup as COM1 (for the serial mouse), but with the SatisFAXtion as COM2 using IRQ3, serial port B must be configured as, say, COM3 at its standard address (3E8), to use the available high IRQ11. This can be easily changed using jumpers and switches shown in Figure 2, following the straightforward instructions in the manual.



Configuration Jumpers and Switches

In this case, first set base I/O address for serial port B at 3E8 (switch SW3) and set the port to use IRQ11 (jumper J5). Then specify this non-default setting in OS/2's CONFIG.SYS file, as follows:

```
DEVICE=D:\OS2\COM.SYS (3,3E8,11)
```

	COM		IRQ
			I/O address

IRQ	USAGE	
0	System Timer	
1	Keyboard	
2	[Cascade]	
3	COM2	<<---SatisFAXtion data modem
4	COM1	<<---serial mouse
5	LPT2	<<--- printer 2
6	Floppy Disk	
7	LPT1	<<---printer 1
8	Clock/Calendar	
9	VGA, (Active)	
10	\$INTELVA	<<---SatisFAXtion fax modem
11	COM3	<<---external modem
12	Available	
13	80486 FPU	
14	Hard Disk	
15	Available	

This still leaves you three IRQs free, in case some future hardware causes problems. Of course, port B can be disabled (jumper J2), if you don't need it for another modem.

The best things are simple, and the DSDP-100 is no exception. It comes with a special cable and a short manual, only the first several pages of which need to be read by an end user. The cable has at one end a D-62 connector which plugs into the card. The other end is a hydra with four D-25 connectors for two serial and two parallel devices (extenders may be required by devices not close to the system).

Additional Comments

At high data rates, serial ports that use the 16550 Universal Asynchronous Receiver/Transmitter (UART) chip are highly recommended, because the chip implements a data buffer that reduces processing overhead, and maximizes performance for high transmission rates and multitasking environments. OS/2 communication drivers recognize and exploit the 16550 UART. Many modems and older DOS communication software may not support high data rates, and even when they do, most older and cheaper serial ports which use the older, bufferless 16450 UART chip inhibit performance. For external modems, make sure your serial ports are configured with 16550AF UARTs. Quatech's DSDP-100 can be so configured upon request.

For most OS/2 (and DOS) users, 16-bit adapters will let you exploit OS/2 with good performance, avoid OS/2's fuss over some of the older and cheaper I/O cards, and obviate the need for manual switches or interrupt sharing (there is no standard for such sharing, OS/2 does not support it, and there are practical limitations running a large number of 14,400bps modems on one interrupt line).

Fabian Pascal is a Palo Alto independent consultant, teacher and writer specializing in relational database and SQL technology, OS/2, and office/portable computing. An industry analyst, he teaches seminars, consults, and has published extensively, including two books. You can reach him on MCI Mail (FPascal), CompuServe (73677,3306), and at 415-325-0646 (voice).

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The Ultimate OS/2 Game

Objects of Desire

Timur Tabi

It seems that the Ultimate OS/2 Game is about to have some serious competition. A company by the name of Stardock Systems (SDS) is developing a variation of MicroProse's Civilization that currently being beta tested. For a sneak preview, download GALCIV.ZIP from an OS/2 BBS near you.

Let it not be said that there is no market for OS/2 games. When SDS initially posted the announcement, they expected only a handful of responses. Inst they got over a *thousand* positive letters from BBS's around the world. SDS promised the game would be a 32-bit multithred implementation. Many of the respondents agree that any well-written OS/2 program must take full advantage of OS/2's multithring capabilities.

A Rose by another

The official title of this game is BattleTech/2, and the executable is now called BTECH2.EXE. Since eighteen months of deep thought has not produced anything more original, I am counting on my readers to submit their most creative suggestions.

Jumping on the C++ bandwagon

This month, I cover the conversion of the source code from straight C to C++. Not only does C++ provide easier ways to perform common C tasks, it also offers new concepts that extend the power of your programming. The

the result is usually extensive redesign.

But don't let that scare you.

The approaches highlighted below illustrate some techniques of transforming a well-written C program into a even better C++ program.

- Before, each module defined some variables and functions that controlled one feature of the game. These are now combined into C++ classes. For example, the MECH module had a global variable called **mech** and a few functions that manipulated that variable and performed operations like drawing the 'Mech on the screen. This organization is easily represented by a single MECH class.

- The global variables themselves were removed. Where global access is necessary, a global pointer to a class is used. For example, several modules need access to the combat

map. Module MAP declares **currentMap** as a pointer to class MAP. Whenever the user selects a new map or opens a map from disk, an instance of class MAP is created with the "new" operator and assigned to **currentMap**. The global nature of the map is maintained, but the ability to have mul-

trick is to recognize these concepts in your existing C code. Inheritance is probably the most important new concept in C++, and it is almost impossible to implement in plain C. Thus, there might be inheritance relationships in a C program which are not obvious. And whenever one is found,

map. Module MAP declares **currentMap** as a pointer to class MAP. Whenever the user selects a new map or opens a map from disk, an instance of class MAP is created with the "new" operator and assigned to **currentMap**. The global nature of the map is maintained, but the ability to have mul-



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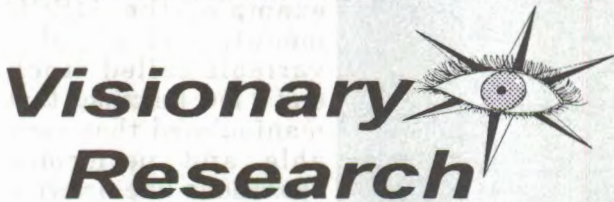
tuple maps also exists.

•Operator overloading and inline functions make most macros (#define statements) unnecessary. For example, the HI_EQUAL macro was used to test whether two hex indices were equal. In its place, the HEX class overloads the == and != operators. With all this in mind, it's time to describe the changes made to each of the modules.

BITMAP

This module introduces a BITMAP class. Previously, an OS/2 HBITMAP structure was used to identify a bitmap. The class maintains this handle as a private member--an example of hiding operating system specific implementations. A bitmap object consists of a bitmap handle, an optional bitmap mask handle, and a screen position.

Just like the first call to BitmapLoad() initialized the PM bitmap engine, so does the first instantiation of a bitmap object. The module keeps count of all bitmaps created, a This module has been removed. The bulk of error detection in this game was done by initialization routines, most of which were converted to constructors. Since constructors cannot fail, the error detection had to be removed. As a result, there



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were no references to the error module.

Actually, constructors can fail, but handling the event is not a clean, easy solution. The classic approach is to have a boolean variable that indicates success, a technique used by class HEX. Alternatively, C++ provides exception handling, a topic that will be covered in a future issue.

FILES

Functions FileOpen() and FileSave() now return a 1 or 0 to indicate success or failure, respectively. They previously returned an ERROR code, but that was overkill. Besides, the error module is gone, so the ERROR codes don't exist anymore.

HEXES

Structure HEXINDEX is now class HEX. A HEX object is nothing more than a location (column and row) on a combat map. A hex is initialized with either a column and row index, or with a screen coordinate (POINTL).

Not surprisingly, all of the other functions have been converted to methods. The interface is cleaner because the methods already know which hex coordinates to use.

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The operator overloading feature described above makes it very simple to compare two hexes. Although the declarations are a bit convoluted, they come straight from any C++ text book.

MAP

This new module combines the features of HEXES and TERRAIN that pertain directly to combat maps. And since maps are now objects, the possibility of having multiple maps simultaneously exists.

The MAP structure has been renamed TILE, and the global array **amap** is now the **map** member of a map object. A tile is a terrain ID and a terrain height, and a map is a two-dimensional array of tiles.

Note that a map is not an array of hexes. Since there is a one-to-one relationship between the indices of the array and the hex locations, an array of hexes would be redundant. A tile contains completely different information from a hex.

The map grid has been removed, since it causes problem for the targeting path algorithm. Of course, the path is still far from perfect, but that is a problem that will be resolved in a future issue.

MECH

A MECH object is a descendant of a HEX object. Since a 'Mech always occupies one hexagon, this inheritance is logical, although I admit it did take me a while to see that. In addition to the normal HEX features, a 'Mech can be moved and drawn. The MECH constructor takes no parameters because there is only one 'Mech and it always starts at (0,0).

Take a look at MECH::move(). The way a 'Mech is erased is by calling HEX's draw() method. Just another example of how clean C++ can be.

MENU

the only difference in this module is the processing of the File commands. Since maps are now dynamically-created objects, the New and Open commands instantiate a map, and the Close command destroys it.

As mentioned above, the map operations were moved from module TERRAIN and placed in their own module.

TARGET

The first thing you'll notice is that the background hexagon highlighting is gone. Not only was it

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too CPU-intensive, but the absence of a map grid means that there is no place to draw the outline of the source hexagon.

The TARGET class has a very simple interface. When a Mech wants to target something, a TARGET object is created, and the constructor takes the source hexagon as a parameter. As the mouse pointer moves, TARGET::move() is called. When targetting is finished, the object is destroyed, and all the graphics are erased.

The header file for TARGET0 has been removed since all of its functions are already declared as private members of class TARGET.

Terrain

All terrain graphics are now bitmaps. This change allows greater flexibility and more consistency since, since there is no need to test whether a certain terrain is a pattern. And since bitmap operations are quicker than area fills, screen redraws are much faster.

Since there is only one set of terrains, the terrain object is a global variable. It is the only object that is statically allocated. The TERRAINS class contains a single constructor which loads all the bitmaps from the executable's resources. The class contains an array of eleven elements, each of type TERRAIN.

In a future version, the terrain data will be stored in a separate configuration file. All maps will have pointers to a terrain class, so that each map can have its own unique set of terrains.

WINDOW

This module has not been changed.

MAIN (formerly GAME)

Now that all the other modules have been covered, the changes to MAIN can be described. The main() function is basically the same (some lines have been rearranged), but it no longer initializes or shuts down any of the modules.

The window procedure, however, has had more extensive revisions. As already mentioned, many of the data elements in BattleTech/2 are dynamically instantiated objects, such as the current map. User input usually determines whether objects are created, destroyed, and manipulated. For instance, a new map object is created only when the user selects File-New or File-Open. The result is that the window procedure translates user input into object manipulations.

Once you switch to C++, you'll never go back to plain C. (continued on Page 60)

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REXXPLORATIONS

Exploring PARSE, PULL and Arg

Eloy O. Cruz Bizet

(Abstract: Man-machine interactions are like conversations, or at least they should be. REXX's powerful string manipulation instructions PARSE, ARG and PULL simplifies setting up these dialogues, thus making programs more flexible and user-friendly.)

In the comedy film *Short Circuit*, a prodigal robot named "Number 5" finds its programming insufficient to cope with the needs of his new-found freedom. Vocalizing its needs, it cycles through repetitions of the phrase "mo-o-o-re input!" This AI's dilemma is not unique. Most programs at one time or another suffer from insufficient data to accommodate the inevitable changes in their environment.

The solution, fortunately, is quite simple. Like "Number 5", programs can be directed to solicit more input from their user when internal programming is lacking.

Our goal, then, is a practical application of string manipulation functions of the REXX language within user-machine dialogues. In this installment of REXXPLORATIONS, we will learn the elements needed to communicate with users and retrieve information from them. This involves learning general rules of parsing in REXX, an overview of the REXX "ARG" instruction, the "ARG()" built-in function and the "PULL" instruction.

INPUT ARGUMENTS

The programmer designs a variety of operating states in which the

user makes a choice. For example, in an accounting program, the choice may be the month(s) to be processed, or the ledger to be updated. These parameters, called arguments in REXX, are stated on the command line along with the request to run the program. See *Example 1*.

Example 1.

```
C:> ledger january
C:> dateconv julian
```

Alternatively, the programmer may choose to acquire these parameters via an interactive dialogue with the user. In some cases, a hybrid of both techniques may be required. This is especially true in the case of critical parameters necessary for the program's operation. If these are omitted on the command line, or found to be wrong, the programmer initiates a dialogue to acquire them (*Example 2*). Adding dialogues to argument-style input steps the user through choices crucial to running the program correctly.

Example 2.

```
USER C:> dateconv Joolian /* parameter misspelled*/

PROGRAM
(SAY) REXX001: (JOO LIAN) incorrect parameter; please
(SAY) re-enter or H for Help.
(PULL)

USER julian

PROGRAM
(SAY) REXX044: Thank you.
```

Many times programmers don't bother with such dialogues. They believe the program will only be used for a short time, therefore not warranting the extra time of coding dialogues. But the history of programs shows us that the longevity of programs is invariably greater than programmers ever anticipate. Friendly dialogues are recommended even if the program is a small "quick and dirty" routine you are coding for yourself. Doing so is usually annoying, especially when you're convinced of the short life the program

will have, but do yourself the favor. You'll thank yourself when that program that was "only needed for a week" is celebrating its third anniversary.

For the new programmer, such dialogues offer an added bonus. A program with user-friendly dialogues is inherently easier to debug than a "mute" one, because its messages, displayed at critical points, make it obvious how far the program got before it failed. With the proper foresight, errors may be predicted and additional meaningful messages delivered, enlightening the user.

RETRIEVING INPUT STRINGS

Input retrieved from the user must be formatted and interpreted into a form your program will understand. REXX uses variables for its string manipulations. Input from the keyboard must find its way into program variables. Two sub-functions of the "PARSE" instruction, the "ARG" and the "PULL" instructions, will handle this for us. These two instructions constitute nicknames for two specific cases of PARSE.

Table 1.

Long Instruction	Nickname
PARSE UPPER ARG	ARG
PARSE UPPER PULL	PULL

The "PARSE" instructions form one of the most comprehensive character manipulation facilities available in REXX. In their simplest form, both "ARG" and "PULL" operate with a single variable, causing the source character string to be retrieved from an external queue (ARG) or the keyboard (PULL), and placed in a variable. In reality it isn't a single variable but a template, the details of which we will discuss later. The format is as follows:

Example 3.

```
PULL var1
/* or */
ARG parm1
```

The single variable form suffices when the input string is a word or phrase that constitutes a single data element. Such simplicity is not always available. When more than one piece of data is being recovered from an external source, multiple variables are required. Furthermore, when a multi-word input string must be split and placed into various variables, more sophisticated manipulation may be required.

PARSING

Parsing is a method REXX uses to analyze data. This input may come from the keyboard or from an argument list. "PARSE" examines the input, splits it into convenient pieces, and then places the value of these pieces in program variables. The rules governing how and where the split occurs are coded as a template.

In its plainest form, a template provides the rules for the parsing operation, specifying the starting position of the split. REXX provides a choice of patterns. The first, called a "string pattern," uses a character as the search argument to find the position in the source string where a split is to occur. The second, called a "numeric pattern," uses numerical values to designate the position number (absolute numeric positioning) or the displacement (relative numeric positioning) of the split. We will demonstrate the "string pattern" with the "PULL" instruction and numeric positioning with the "ARG".

By default, one word of the source string is assigned to each variable in the list. This occurs from left to right until the words of the input string are exhausted.

Example 4a.

```
REXX PROGRAM PULL var1 var2 var3
```

When the number of "words" in the input string exceeds the number of variables, all residual words are assigned to the last variable. Each variable will contain one word except the last. *Examples 4b and 4c* illustrate this.

Example 4b.

```
KEYBOARD INPUT      No time like the present
                      var3
                      var2
                      var1
```

Example 4c.

```
RESULT var1=NO
      var2=TIME
      var3=LIKE THE PRESENT
```

Observe that the contents of var1, var2, and var3 have been stripped of both leading and trailing blanks before being assigned.

In the next example (5a, b and c), we show the result of having more variables in the template than words in the source string. Pattern matching proceeds from left to right, assigning a word to each vari-

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able. When words in the source string are exhausted, and additional variables are unassigned, they are assigned the null ("") value.

Example 5a.

```
REXX PROGRAM
var6 = 'abcdefg'
PULL var1 var2 var3 var4 var5 var6
```

It's important to note that all variables are assigned a value. In this *example*, variable "var6" is assigned the null value as a result of being operated on by "PULL."

Figure 5b.

```
KEYBOARD INPUT    No time like the present

                                var6
                              var5
                            var4
                          var3
                        var2
                      var1
```

Figure 5c.

```
RESULT  var1=NO
        var2=TIME
        var3=LIKE
        var4=THE
        var5=PRESENT
        var6=""
```

Before continuing to investigate more details of parsing, review

some of the general rules of parsing shown in Table 2. These rules apply equally to "ARG" and "PULL".

Table 2.

General Rules of Parsing

- All variables that appear in a template are assigned a value. If there are more variables than words, remaining variables are set to null. See *examples 5a and b*.

- A template consists of alternating pattern specifications and variable names.

- The pattern specifications and variable lists are processed strictly left to right and are used only

once.

- In simple usage, both pattern lists or variables may be omitted so patterns without intervening variables, and vice-versa, can exist.

- The value assigned to a variable are those characters in the input string between the point when it is matched on its left, until it is matched on its right. See *Example 7a and b*.

- If a variable is first in the template, an implied pattern, matching the string, is assumed. Also, if a variable is the last item in a template, it is assumed to match the remainder of the string. Thus, in its simplest form, a single variable contains the entire string.

- Setting a variable during parsing is identical to setting a variable in assignment.

- The construct of a pattern is a string that acts by searching for a match. A string pattern may be null. This may be used to match the end of a string. Numerical patterns specify the absolute or relative

- Variables may be used to specify both string and numeric patterns.

- If a pattern match cannot be found in the string, the prior variable is matched to the end of the string.

See Example 7b.

SAY : THE DELIVERY OF THE QUESTION

The "ARG" or "PULL" instructions can't issue text hinting at what user input may be desired. Therefore, it's necessary to display prompting information to the user using the "SAY" instruction prior to issuing the "PULL" instruction. REXX programs commonly have pairs of "SAY/PULL" instructions, the "SAY" displaying the prompt's text and the "PULL" collecting the user's response.

Here are three examples of the "SAY" instruction. The second example shows how to continue a string. The trailing comma controls the continuation and is not included in the actual text string.

Example 6.

```
/* simple SAY */
SAY  'the string is short.'

/* continued SAY */
SAY  'the string is verbose and requires more room
than ',
     'can be accommodated on a single line.'
```


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```

/* Variable assigned SAY */
part1= 'the string is verbose and requires more room
than '.
part2= 'can be accommodated on a single line.'
SAY   part1||part2

```

THE PULL INSTRUCTION

The REXX "PULL" instruction has the general format

```
PULL[template]
```

This instruction is used to collect characters from the keyboard buffer, in other words, to retrieve what the user just typed. REXX considers the keyboard buffer an extension of the "external queue" and retrieves from it when the "PULL" command is executed.

"PULL" is a nickname for the longer

```
PARSE UPPER PULL[template]
```

"UPPER" requests that REXX translate the given string to upper case characters before assigning it to a variable. The nickname "PULL" has this as the default. When you wish to work with mixed case strings, you will have to forego the nicknamed instruction and use "PARSE PULL."

Example 7.

Question:

```

SAY  "What's your name?"
PULL  age
/* user responds 'john' */
SAY  age
/* REXX displays "JOHN" */

```

When parsing, it's possible to use a "pattern string" to designate where, within the source string, a split is to occur. When the pattern string is encountered in the input, the characters that match the pattern are excluded from the extracted text. What came before the pattern string is assigned to the previous variable. What comes after is assigned to the next variable(s). In *Example 7a*, we see the "PULL" instruction using the comma (",") as a search pattern in the template.

Example 7a.

CONFIRM:

```

SAY  "Your file will now be updated."
SAY  "Enter confirmation and access code."
PULL confirmation "," acode remainder
/* 1 comma */

```

```
/* user responds "update ok , a334 x23" */
```

```

Variable confirmation = 'UPDATE OK '
/* 2 trailing spaces */
Contents acode = "A334"
remainder = "X23"

```

Because the comma (pattern) occurs between two variables, all text, including leading and trailing spaces, before the comma is assigned to the first variable "confirmation." The remainder is assigned to the variable "acode ." The comma itself is absorbed, and doesn't become part of any variable.

Similarly, in *Example 7b* the comma is used twice as a search pattern in the "PULL" template. The variable "remainder" is assigned a null value. The reason may not be immediately obvious, but upon reviewing the last rule of parsing, we see the answer.

Example 7b.

CONFIRM:

```

SAY  "Your file will now be updated."
say  "Enter confirmation and access code."
PULL confirmation "," acode "," remainder
/* 2commas */

```

```
/* user responds "update ok , a334 x23" */
```

```

Variable confirmation = 'UPDATE OK '
/* 2 trailing spaces */
Contents acode = " A334 X23" /* 1 leading space */
remainder = '' /* null */

```

The appearance of a second comma in the pattern template forces the parsing operation to place all text between the first comma and the second into the variable "acode." Since no second comma exists in the source string, A334 X23 is assigned to "acode" regardless of the blank, while a null value is assigned to "remainder."

THE ARG INSTRUCTION

From constant repetition, users adapt to what information a program expects. Sometimes dialogues

which were helpful in urging the user along as a neophyte may become trite annoyances and hindrances. It's similar to dealing with cute answering machine messages cajoling you to leave a reply. By the third or fourth time it's played, it's no longer quite so cute.

This user is ready for the fast-track. Granted, confirmations and other warnings will remain, but it may not be practical to continue prompting. As an alternative, the user can enter these values in advance as the program is started, as in *Examples 8 and 9*.

The "PULL" instruction cannot handle this source of data, since it isn't, strictly speaking, the keyboard. This type of input is an external queue containing data from the OS/2 command prompt. Instead of "PULL," we must use the other variation of "PARSE," the "ARG" instruction. Its general format, and use of a template, is similar to that of "PULL".

As was the case with "PULL," **ARG[template]**, is a nickname for the command:

PARSE UPPER ARG[template]

To start a REXX program, the user needs only to type in the eight character CMD file name on the command line of an OS/2 full screen session or OS/2 window. Any additional text following the command name is stored in a data queue. In OS/2, this is the mechanism for passing arguments to a program. This information is then retrieved using the "ARG" instruction.

To wrap up discussion of templates, "ARG" will be demonstrated using "numeric pattern positioning." This doesn't imply any preference for its use with "ARG." Either string or numeric pattern positioning can be used.

Example 8 refers to a hypothetical general purpose network connect program, written in REXX, called SNA370. The program is shared by all users and any user can choose any destination/route to a remote computer. No specific network nodes or information are coded inside. Users choose the parameters as they start the program.

Three parameters—the link name, network name, and the user's logonID—are required arguments. These are typed on the command line after the REXX command name (SNA370) with intervening spaces. Numeric positioning patterns, both relative and absolute, are used to split up and extract values.

In REXX, you have the ability to test that all arguments needed have been entered. This simplifies coding syntactical checks, since you will be certain the variable does contain data. For this, we use the "ARG()" built-in function. Do not confuse this with the "ARG" instruction. These two are NOT the same.

It is unfortunate that they were named so similarly. Note that the "ARG()" built-in function must have the open and close parentheses coded.

ARG([n],option))

"ARG()" has two optional arguments, "n" and "option". The first is the sequence number of the argument whose existence you are testing. The second argument is a "presence/absence test option." Use "E" if you are testing for [E]xistence or "O" if testing for [O]mission. In each case, the function returns a value 1 if the condition is true, and 0 (zero) if it's false.

Example 8.

```
USER C:>SNA370 nyc0940 vtam003 bizetec
INPUT
```

```
Used by Command Interpreter      Passed to REXX
```

```
SNA370                          nyc0940 vtam003 bizetec
```

```
/* SNA370-REXX front end to 3270 Emulation Program*/
REXX /* RETRIEVING ARGUMENTS */
PROGRAM
  parseinput:
    exists = ARG(1,'e')
  /* ARG() built in function */
  /* test if arguments were provided */
  IF exists = 1 then
    do /* yes they were */
      /* parse argument string */
      /* extracting actual values only */

      ARG linkname =9 netname +8 logonid

      /*start the network program */
      START SNA370 linkname netname logonid
    end
  else
    do
      SAY "SNA050: Invalid or missing arguments.",
        "Try again, please"
      exit
    end
```

Following our test for existence, you see the "ARG" instruction controlled by a template using a "numeric" positioning pattern. The start of the string is assumed at position 1, since the first item in the template is a variable. At position 9, indicated by the absolute location (=9), the second variable is split from the first. Finally, 8 positions later (+8), the last split occurs. See *Example 9*.

Example 9.
start (=1)

(+8) columns right
column (=9)

V V V
NYC0940 VTAM003 BIZETEC

V V V
linknamenetnamelogonid

The simplicity of these examples may not show off the total potential of REXX parsing. It is merely a point of departure for experimentation and REXXPLOATIONS. I leave it up to your imagination to decide where these techniques will enhance your own programs. As you gain experience, you will start to add more sophisticated elements to your programs. This will add function ality as well as elegance to your technique.

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"IBM Operating System/2 Procedures Language 2/REXX, Reference" S01F-0271, IBM Corp. (1992)

OS/2 1.3 readers may find a simple introduction to REXX in IBM Operating System/2 Users Guide, Volume 1: Base Operating System, S01F-0289, IBM Corp. (1990)

On-line information is available in OS/2 Version 2.0 in the Information Folder "REXX Information" (1992)

Describe Tips

by Allan R. Katzen

It has always been important at DeScribe that our product follow the rule of "Innovation, not Imitation." Certain DeScribe characteristics and features may appear strange to users of a competitive product who stand firm on their preconceived notions.

A classic example of such a misunderstood feature is the way you use the cursor to select (highlight) text to perform block moves and duplicates in DeScribe. In other products, when you select a block of text and move the cursor to a new location, you deselect the text. Moreover, you automatically delete selected text when you enter a new character. In DeScribe, however, you can move the cursor to any other position in the document and the previous text remains selected.

Why does DeScribe perform differently? In order to maintain a technological edge, DeScribe continues to improve on existing methods. In DeScribe, move and duplicate text functions bypass the clipboard - requiring the ability to move the cursor without deselecting the text. DeScribe also lets you enter new text before you move or duplicate the selected block.

You can even move and duplicate the selected block to a different document window, again without using the clipboard. Try dragging and dropping text from page 1 of a 20-page document to the last page using the mouse. Pretty nasty without using the clipboard functions - cut, copy, and paste. DeScribe's advanced functionality simplifies the task: define the text, go to the end of the document, and move.

Different, YES. Difficult, NO. Too often, when we are learning a new software program, we mistake "different" for "awkward." But innovative products like DeScribe lead us to more powerful features, ease of use, and significant productivity gains.

Subscribe And SAVE 800-365-2642

SHAREWARE

Graphics To Go, Please!

Steve Mathesius

Software developers have been good to OS/2. At least, that is the case on the graphics front: my decision of which programs to review for this graphics special wasn't easy. After a great deal of time reviewing the many programs available I came up with three programs that deserve recognition. Two of the programs have obvious uses in the "real-world": Image-management, and screen-capture. The third program, PM Fractint, is simply a fun and educational program—a rare combination indeed!

Of these programs, two are shareware while one is freeware. For those of you new to computing, I'll run down the definitions again: Shareware is the "try-before-you-buy" concept—if you like a program and/or use it regularly, then you must pay for it. If you don't like the program then simply stop using it. Freeware is just as the name implies: free software. You never have to pay for freeware, simply use it and enjoy it.

GALLERIA 1.5

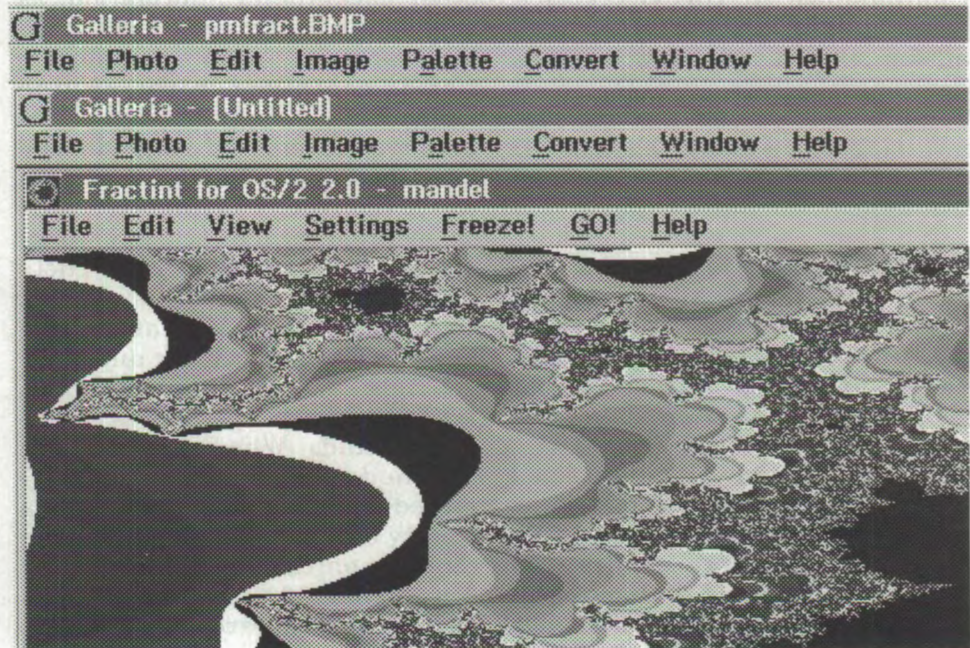
Ever notice how many image management programs there are for OS/2? Let's count them: Gif32, ImageArchiver, JoeView, PMJPEG, PMVIEW, and Galleria—six total that I have found in my many hours of scouring the BBSes and other sources. Each one has its

own special features, but I've found that Galleria does virtually everything you would want, and much more too.

Images can be displayed at virtually any resolution—although resizing a 640x480 image to 2000x2000 can cause OS/2's swap file to grow tremendously. One of Galleria's best features is that it works with a wide variety of image formats. Some of the more popular formats Galleria works with include GIF, BMP, TIF, IFF, JPG, PCX, WPG, and Kodak's Photo-CD format among others. Galleria can

also save images in GIF, OS/2 BMP, Windows 3.x BMP, TIFF 5.0, WordPerfect 5.0 graphic, as well as several other formats. This wide variety of graphics formats helps Galleria excel at image-viewing as well as file conversion. After all, what good is an image display program, if it doesn't handle the images you work with? Displaying can be done manually or in slide-show fashion, with one right after another at a specified interval. You can also transfer images to the clipboard or print them.

Galleria doesn't stop at image



display/conversion. Galleria also lets you change many of the aspects of the image. Think the image is too dark? Then just change the brightness a little bit. Think the image would look better if it was grey-scale? Then just change it to grey-scale. Wish contrast was higher? You guessed it, just change the contrast. You can also mirror the image, invert it, rotate it, you name it... By now you probably get the picture—Galleria does just about everything a person would want to do to an image. While Galleria isn't a graphics program along the lines of CorelDraw or Freelance Graphics, it does fill a niche. Throughout all my testing, I found only one quirk about Galleria. Galleria has a 21-day evaluation period before you should either stop using it or register. This is fine, but the developer enforces it strictly—after 21 days Galleria will refuse to run. Besides that minor point, I had no problems with Galleria. The latest version of Galleria can always be found on Compuserve in the OS2USER forum and on the Fernwood BBS among other places. Galleria was developed by Bitware Software & Services of Australia, and the registration price is AUD \$75/USD \$51 (USD = U.S. Dollars, approximately).

GALLERIA/CM 1.5

Galleria/CM is a screen capture program that simply takes a snapshot of your display and saves it as a bitmap file. Galleria/CM was reviewed just two months ago as Nikon II. Given that, I encourage you to flip back to issue 8 and check out the review for Nikon II. Galleria/CM can be found in the same archive as Galleria—download Galleria and you get both. As with Galleria, the latest version of Galleria/CM can

be found on Compuserve and Fernwood. Galleria/CM was also developed by Bitware Software & Services. Galleria and Galleria/CM can be registered together for AUD \$99/USD \$67. Existing Nikon II users can upgrade to Galleria and Galleria/CM for AUD \$40/USD \$27.

PM FRACTINT 17.2

Ok, Ok, so PM Fractint probably isn't a necessary business program. And PM Fractint isn't going to solve any of your financial problems. PM Fractint won't play a good hand of poker, but PM Fractint will answer all your questions about fractals and do a bunch of other neat fractal things too. PM Fractint is a fractal generator that can produce over seventy types of fractals. These seventy types cover just about everything: Mandlebrot, Julien, Barnsley, Lorenz, and Sierpinski are just a few of them. For each fractal type there is also a history of where that fractal type originated and other background information, as well as the actual equation(s) used to produce it. All of this information is contained in the on-line help which is very thorough. PM Fractint is multithreaded—the user-interface is one thread, while the fractal engine (the part of the program that actually works out the equation and constructs the fractal) is on another thread. This means that you can start a new fractal generating and then get right to work on other things, while the fractal generates in the background. When the fractal is finished generating and is displayed on your screen you can do a variety of things. PM Fractint can zoom in on the fractal, either by factors (like 50%) or by drawing a box around the area you wish to zoom in on. You can copy and

paste to the clipboard, and you can save the fractal image to a file—a GIF, Windows bitmap, OS/2 bitmap, or a PCX file. You can also size the fractal up to 4096 by 4096, at 256 colors. Be forewarned—just as with Galleria, an image that big requires lots of memory: 32 MB of RAM to be exact! OS/2 can provide that much memory (thanks to virtual memory and your beloved swapper.dat file), but your hard drive will take quite a thrashing. There are also a number of options you can set for how PM Fractint works. You can set ranges, number of passes, whether you want PM Fractint to use integer or floating-point math, biomorph colors, decomposition, image size, colors, etc... The number of different things you can do with PM Fractint is virtually limitless. PM Fractint was developed by Donald P. Egen with and is based on the DOS and Windows versions. PM Fractint is freeware.

Now I can hear some of you asking, "How do I get this great software?" The easiest way to get the software I review is by ordering the OS/2 Monthly Shareware Disk. For only \$4.00 you can get this month's disk. You can also order a six-disk subscription for \$24.00 and have each month's disk mailed to you as soon as it is available. The latest versions of the programs I review here are on the disk, as well as a little more as space permits. You can call (908) 937-6542 to order your disk or subscription. You can also find most of the programs I review on your local OS/2 BBS or on CompuServe in the OS/2USER libraries.

If you're a developer, feel free to send me your latest program and I'll be sure to check it out. You can get in touch with me through the magazine, or feel free to E-mail my CompuSer ID which is 72172,51.

CREATING THE COMPLETE OS/2 DEVELOPMENT ENVIRONMENT

How to Implement an "INFORMATION FACTORY"

Tim Bryce & Paul Wylie

INTRODUCTION

The advent of personal computers in the 1980's has radically changed the face of corporate computing. At first, PC's were considered curiosities limited to word processing and spreadsheet applications. But as their power grew, both in terms of chips and capacity, new and more sophisticated uses of the PC have spread throughout businesses much like the nervous system of the human body. So much so that the cry "downsizing" is heard in just about every company and government institution around the world.

The use of PC's for application development first appeared in the late 1980's with the CASE movement (Computer Aided Software Engineering). Even though there had been several development tools available on the mainframe for a number of years, they really didn't proliferate until the arrival of the PC. This was primarily due to the fact developers were fighting for contention on the mainframe which, for obvious reasons, gave priority to the operational computing needs of the business. Consequently, development time lagged as programmers waited for compilations and tests. The PC, therefore, unshackled programmers from the mainframe and allowed them to design and develop software independently.

Although CASE tools freed programmers from the mainframe, they were still restrained by the processing limitations of the PC and its principal operating system of the day (DOS). Fortunately, this was all to change with the introduction of the 386 chip and IBM's OS/2.

The problems and restrictions of DOS and WINDOWS are well known and documented; speed, mem-

ory, error protection, lack of multi-processing, a clunky file system, etc. OS/2 has overcome these problems in a quantum leap, making the DOS and WINDOWS era seem like the prehistoric past. Among OS/2's strengths are its 32 bit processing speed, along with multi-tasking and virtual processing, not to mention its ability to run WINDOWS and DOS applications. Such power enables companies to "downsize" and distribute their computing environment at a fraction of the cost needed to maintain mammoth mainframe data centers. It also provides smaller companies with the same type of computing power that at one time was only affordable to big business. The point is, OS/2 is radically changing computing in companies, both at the end-user level and at the development level.

There are fundamentally two considerations for establishing an effective development environment: management and technical. This article will describe what is necessary to implement both in order to establish an effective development environment.

MANAGEMENT ENVIRONMENT

Establishing the management environment is a prerequisite for the technical environment. It begins with an understanding of the scope and magnitude of the development organization. Obviously, there is more to development than writing software; for example:

- The enterprise has to be studied and analyzed to determine information requirements.
- Corporate priorities have to be established.
- Systems have to be designed, including the

engineering of business processes.

- Inputs and Outputs have to be designed.
- Data has to be accurately defined.
- Data bases have to be designed and developed, both logically and physically.

In this day and age, any company that is simply trying to write software faster has a rather myopic and backward outlook on development. There are actually several types of information resources to be developed which can be divided into three classes: Business, Systems, and Data resources.

BUSINESS RESOURCES - Enterprises, Business Functions, Positions/Jobs, Human/Machine Resources, Skills, Business Objectives, Projects, and Information Requirements.

SYSTEM RESOURCES - Information Systems, Business Processes, Administrative Procedures (i.e., Manual Procedures, Office Automation Procedures), Operational Steps/Instructions, Computer Procedures, Programs, Modules and Subroutines.

DATA RESOURCES - Data Elements, Logical Records (Views), Logical Files (Objects), Physical Storage Records, Physical Files (including computer files and manual files), Data Bases, Inputs, Outputs, Transactions, Messages, Panels and Maps.

The intent of an Information Resource Management (IRM) philosophy is to develop, catalog,

solely concentrate on computer software. In fact, IRM involves much more than just software engineering.

In a robust development organization there are several business functions participating in development activities so that the work load is evenly distributed. Each requires its own unique set of skills and proficiencies (see Figure 1).

The **ENTERPRISE ENGINEER** (Business Analyst) monitors and analyzes the business and specifies business objectives and information requirements. The information requirements are passed on to Systems Engineering for implementation. The Enterprise Engineer will also identify enterprise level objects (logical files) which are passed on to Data Engineering for implementation.

The **SYSTEMS ENGINEER** (Systems Analyst) represents the principal architect who must design systems to satisfy information requirements. This includes defining the logical business processes within systems and the most cost effective approach for implementing them. Business processes can obviously be implemented many ways; computers are but one. The Systems Engineer must pass specifications regarding application objects (logical files) to Data Engineering, and process specifications to Software Engineering.

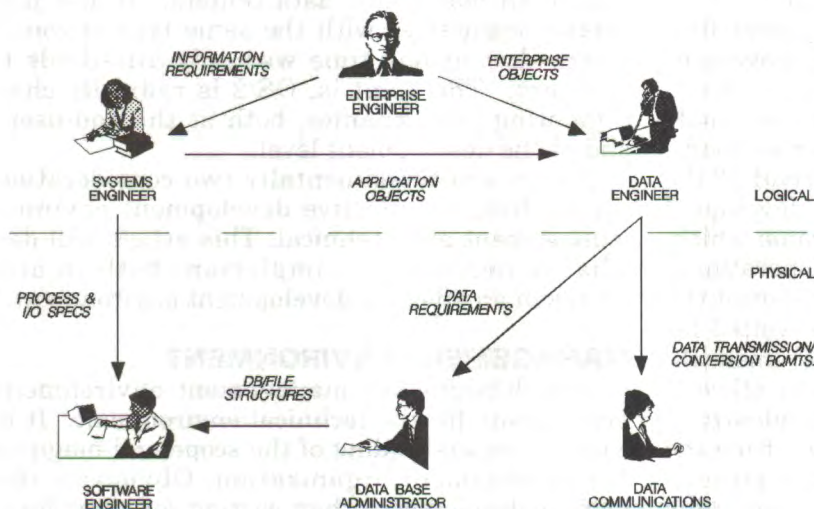
The **DATA ENGINEER** (Data Analyst) creates and/or updates the enterprise logical data base model based on specifications received from Enterprise Engineering and Systems Engineering. In turn, the Data Engineer passes logical data requirements to Data Base Administration for implementation and data transmission/conversion requirements to Data Communications Administration for handling.

DATA COMMUNICATIONS ADMINISTRATION (DCA) devises the physical implementation for data conversion/transmission requirements.

DATA BASE ADMINISTRATION (DBA) evaluates systems and data requirements and determines the most appropriate way to physically store and access data. In turn, the DBA creates physical file/DB structures for Software Engineering.

The **SOFTWARE ENGINEER** (Programmer) studies process requirements received from Systems Engineering and creates software to implement the computer portions of the system. Physical file layouts

FUNCTIONAL RELATIONSHIPS



and reuse these resources to satisfy corporate information requirements. Such an IRM environment is much more comprehensive than what has been defined by IBM's AD/Cycle or DEC's Cohesion which

are obtained from the DBA.

What this illustrates is that Software Engineering by itself does not represent the entire development effort; rather, it is at the bottom of the development chain. However, in the absence of such a defined environment, the Software Engineer is forced to perform the work of the other functions, talents for which they are not normally suited.

The three classes of information resources ultimately represents the basis for three different types of development activities:

ENTERPRISE ENGINEERING is the discipline concerned with studying the business and formulating an enterprise information strategy synchronized with business goals.

INFORMATION SYSTEMS ENGINEERING is used to design and develop enterprise-wide information systems. Software Engineering is considered a subset of Information Systems Engineering.

DATA BASE ENGINEERING designs and develops the corporate data base to be synchronized with all corporate applications.

Because of its orientation towards front-end planning, Enterprise Engineering is considered a precursor to Information Systems Engineering and Data Base Engineering.

Implementing these disciplines requires a reorientation and reorganization of the development environment. No longer can companies afford to hand-craft information resources. In order to satisfy the growing demand for information, requires a company must establish processes for mass production. To appreciate the virtues of this, consider the five basic elements of mass production:

1. **MASS DEMAND** - this is the impetus for mass production. It is represented in this area by the backlog of user requests for information.

2. **DIVISION OF LABOR** - to break the production process into separate tasks performed by specialists (humans, machines, or both).

3. **ASSEMBLY LINE** - a process defining the progression and synchronization of work.

4. **PRECISION TOOLING** - deployed as required throughout the assembly line process. Such tooling provides mechanical leverage to perform certain tasks of work.

5. **STANDARDIZATION OF PARTS** - for interchangeability and assembly by unskilled and semi-skilled workers.

There is no reason why these same ele-

ments cannot be applied to the production of information resources. This is the basis for what we refer to as the "INFORMATION FACTORY."

INFORMATION FACTORY CONCEPT

The underlying premise behind the "INFORMATION FACTORY" is that the development of information resources should be treated as a science, not an art-form. It means there are certain inherent principles of management and design governing the development process.

There are three basic components within any engineering/ manufacturing facility (see Figure 2):

ASSEMBLY LINES - defined stages of work used to build products. A variety of techniques and tools can be used throughout the assembly line.

PRODUCTION CONTROL - oversees the assembly lines, looking for unanticipated delays or accelerations in production schedules. Consequently, corrective action can be taken as required to resolve problems.

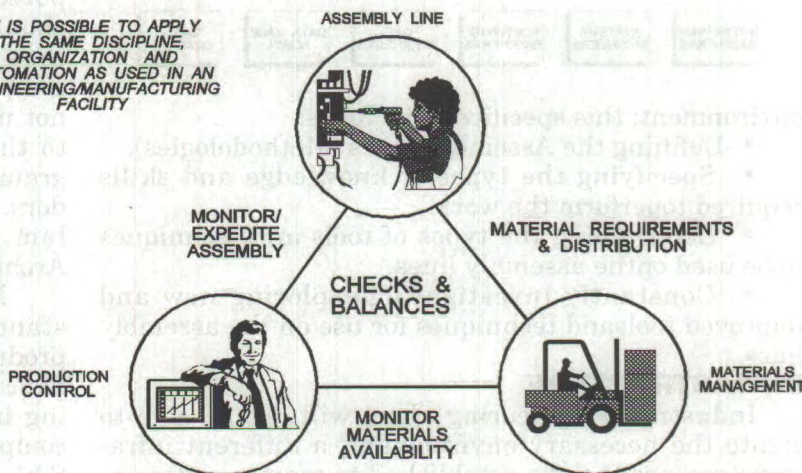
MATERIALS MANAGEMENT - the business function concerned with standardizing parts so they may be shared and reused in various product assemblies. Further, it is concerned with collecting, storing and retrieving parts in the most efficient means possible (i.e., JIT - "Just In Time").

The same approaches can be used to create an "INFORMATION FACTORY":

METHODOLOGIES (Assembly Lines) defines the work environment by establishing WHO is to perform WHAT work, WHEN, WHERE, and WHY, thereby synchronizing the flow of work. Within the phases of

FACTORY CONCEPT

IT IS POSSIBLE TO APPLY
THE SAME DISCIPLINE,
ORGANIZATION AND
AUTOMATION AS USED IN AN
ENGINEERING/MANUFACTURING
FACILITY



the methodology, a variety of techniques and tools may be used which defines HOW the work is to be performed. Within the "INFORMATION FACTORY" there are actually three complementary methodologies: Enterprise Engineering (for developing business resources), Information Systems Engineering (for Systems Resources), and Data Base Engineering (for data resources).

PROJECT MANAGEMENT (Production Control) is used to plan, estimate, schedule, report, and control project work. As such, it oversees the methodologies.

RESOURCE MANAGEMENT (Materials Management) identifies and classifies information resources, thereby promoting sharing and reuse of resources. It is also concerned with the collection, storage, and retrieval of resources in a timely manner.

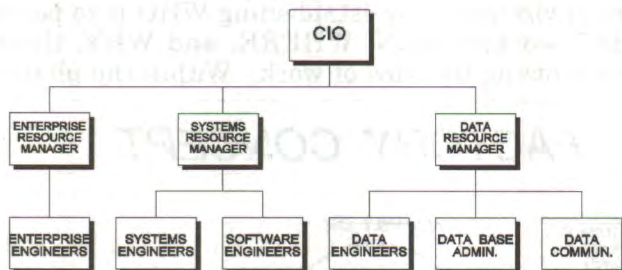
Implementing an "INFORMATION FACTORY" environment requires special skills which, again, are not unlike those found in engineering/manufacturing; in particular, Industrial Engineering. The objective of Industrial Engineering is to define the development

tion resources (see Figure 3 above). At the highest level is the Chief Information Officer (CIO) who establishes policy and is a member of the executive management team. Subordinate to the CIO are three resource managers: Enterprise Resource Manager, Systems Resource Manager, Data Resource Manager. Each manager has primary responsibility over their class of resources and the methodology to develop them. However, each manager is allowed to review/approve the work of the others, thereby creating a set of checks and balances over the information resources. Such reviews are necessary to assure resource integration, promote sharing, and eliminate redundancy.

It is one thing to legislate new policies and procedures, but quite another to enforce it. Consequently, a Quality Assurance (QA) organization is required as a staff function to the CIO in order to monitor and enforce the development environment. The QA organization consists of Industrial Engineers/Inspectors, Training/Education personnel (to sharpen pertinent skills), a Technical Library to maintain design and project documentation, and a Project Administration function to police the project management system. Some people may argue such a QA organization will create a bureaucratic overhead. Just the reverse will occur; it will actually reduce overhead and bring development costs down, while the quality of information resources will soar.

IRM INFRASTRUCTURE

SEPARATE RESOURCE MANAGERS ESTABLISH
AN INTERESTING SET OF 'CHECKS & BALANCES'



environment; this specifically includes:

- Defining the Assembly Lines (Methodologies).
- Specifying the types of knowledge and skills required to perform the work.
- Determining the types of tools and techniques to be used on the assembly lines.
- Constantly investigating/exploring new and improved tools and techniques for use on the assembly lines.

INFRASTRUCTURE

Industrial Engineering alone will not be able to create the necessary environment, a different infrastructure needs to be established to manage informa-

TECHNICAL ENVIRONMENT

Although it is highly desirable to have a homogeneous computing environment, the development and production computers need not necessarily be of the same type. Companies are discovering that information resources can be designed on one platform and ported to another. Ideally, the two environments should be the same, but this will not always be the case. The problem hinges on the issue of software compatibility; what runs on one type of computer will not necessarily run on another. This is primarily due to the lack of operating systems standards in programming languages and compilers by computer vendors. Some vendors are trying to overcome this problem, such as IBM with its System Application Architecture (SAA).

More than anything, SAA represents a set of standards for development as opposed to a specific product. The intent is to develop software in accordance with a rigorous set of standards thereby providing interoperability between IBM's diverse range of computers (from PC to mini to mainframe). Under an SAA environment, software can be developed in the

OS/2 environment for use under MVS, VM, or OS/400.

TOOL REQUIREMENTS

An "INFORMATION FACTORY" consists of a series of networked OS/2 workstations used by the various development functions mentioned earlier. Although the development functions will require different types of tools, all must be connected via a network in order to effectively communicate and share information resources.

The fundamental tools required by all development functions include:

1. **METHODOLOGY INSTRUCTIONS** - providing text narrative and examples to step a person through the development process. Also, a Glossary of Terms should be provided so the development organization can communicate in a consistent manner. Such instructions should be made available both on-line and as printed standards manuals.

2. **PROJECT MANAGEMENT SYSTEM** - in addition to planning, estimating and scheduling projects, development personnel will need to report their time on development activities. Time is charged to projects for analysis and control purposes, as well as to bill clients for project work.

3. **REPOSITORY** - to catalog, control and cross-reference all information resources. As we will see, this tool is essential for integrating all development efforts.

Additional planning and design aids are required based on the related development function:

ENTERPRISE ENGINEERING TOOL REQUIREMENTS

1. **Documentation Aids** - including text reports and graphical aids (i.e., Matrices and Hierarchy Charts).

2. **System Portfolio** - to catalog and classify the systems and business processes used by the enterprise.

3. **Organization Analysis Aids** - to study the business to determine the most effective organization structure. Such aids are useful for "flattening" the organization structure.

4. **Skills Inventory** - to catalog and cross-reference the talents and proficiencies of human and machine resources.

5. **Priority Modeling Aids** - to analyze and calculate corporate priorities, both business objectives and supporting projects.

SYSTEMS ENGINEERING TOOL REQUIREMENTS

1. **Documentation Aids** - including text reports

and graphical aids (i.e., Flowcharts). Such documentation is used for design manuals, end-user manuals, Computer Run Books (for operations) and to convey software requirements.

2. **Reverse Engineering Tools** - to interpret and document existing systems and business processes.

3. **Automated Design Facilities** - to assist in the design of business processes within a system.

4. **Screen Painters/Prototyping Aids** - to prepare illustrative examples of inputs and outputs (reports, screens, forms, etc.). This includes the development of Graphical User Interfaces (GUI).

SOFTWARE ENGINEERING TOOL REQUIREMENTS

1. **Documentation Aids** - including text reports to specify software and graphical aids to support various flowcharting and diagramming techniques (i.e., data flow diagrams, block diagrams, decision tables, hierarchy charts/indented lists, etc.). Source librarian aids also fall into this category.

2. **Reverse Engineering Tools** - to interpret and document existing source code, thereby simplifying maintenance.

3. **Program Generation Tools** - for procedural languages (such as COBOL, C, ADA, etc.) or non-procedural languages (i.e., Fourth Generation Languages, and Report Writers)

4. **Compilers and Test/Debugging Aids.**

5. **Computer Command Language Generators** - to generate such things as Job Control Language (JCL), PC command files, etc.

Software Engineering is an area where CASE tools excel. Selection of CASE tools will depend upon the design techniques and programming languages used by the company. For example, there are significant differences between Structured Programming and Object Oriented Programming. Consequently, the tools implementing such techniques will differ significantly. Also, program generators and compilers will differ based on the selected programming language.

DATA ENGINEERING TOOL REQUIREMENTS

1. **Documentation Aids** - including text reports and graphical aids such as Matrices and Logical Data Base Diagrams (E/R Charts).

2. **Data Classification Aids** - taxonomy structures/aids to uniquely identify and classify data.

3. **Logical Data Base Design Aids** - to automatically construct logical records and files; i.e., "Normalization" aids.

(Note: The column will continue next month with "Database Administration Tool Requirements")

For Immediate Release



mdbs ships object oriented development system as 32-bit system

Micro Data Base Systems, Inc., Two Executive Drive,
PO BOX 6089, Lafayette, IN 47903-6089

CONTACT: Denise Buhrmester (317) 447-1122
mdbs Shipping Object/1 as 32-bit OS/2 Application Micro Data Base Systems (mdbs) announced that it is shipping Object/1 version 3.0. Object/1 is an object oriented development environment. This release is a 32-bit OS/2 version of the product. Object/1 Version 3.0 for Windows is expected to ship by the end of the first quarter of 1993. The major enhancements in Object/1 3.0 include 32-bit operations, improved database connectivity and performance, and complete portability of applications between OS/2 and Windows.

In addition to operating as a 32-bit OS/2 application major enhancements have been made to the Object/1 forms painter. These enhancements have improved database connectivity and the assignment of functionality to controls. The net result is an environment that merges the convenience of point-and-click development with an extremely flexible and complete object-oriented language. The forms painter also offers developers a complete suite of all the new OS/2 controls. Product performance has been improved by the additional assembly and C code in the kernel.

Version 3.0 also embodies mdbs' core philosophy of reducing complexity in mission-critical applications development. Version 3.0 will synchronize Object/1 in Windows and OS/2 2.0. Therefore, developers can write an application in OS/2 and recompile it to run in Windows without making any code changes and visa-versa.

Object/1 version 3.0 is priced at \$3,995. This price includes:

- the base system
- one professional pack
- Introduction to Object/1 training class

- and the application development system (ADS)

The ADS allows royalty-free distribution of an unlimited number of applications. for further information regarding Object/1, contact mdbs at (800)344-mdbs.

KnowledgeMan and GURU Introduce Improved User Interface, Faster Performance, and Event-Driven Programming in Version 3.1

Micro Data Base Systems (mdbs) announces the release of version 3.1 for both KnowledgeMan and GURU. KnowledgeMan is a relational database management system for business applications. GURU is a comprehensive expert system environment. Version 3.1 highlights include a completely rewritten user interface, I/O speed improvements, and the addition

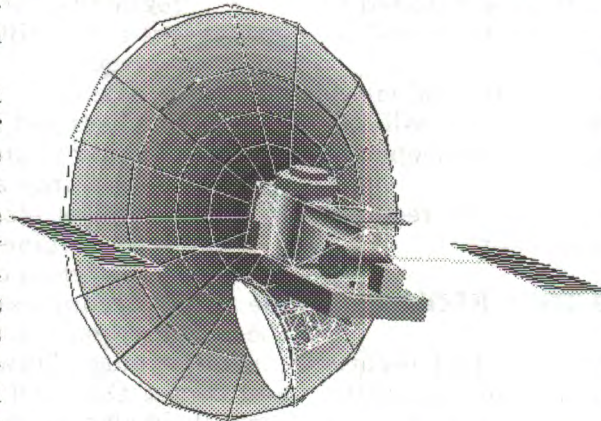
of new event-handling functions to the KGL programming language. KnowledgeMan and GURU are both available for single-user MS-DOS based PCs, OS/2, most popular LANs, DEC VAX/VMS, and SUN Unix environments.

Querying capabilities of Commander have been greatly improved. In this new version, Query by Example (QBE) allows users to make multiple queries on multiple tables and display the results on the

screen in tabular form or as a standard select listing (on screen or printer). The queries generated by the QBE interface are optimized to take advantage of available indexes. The code used to generate these views can be saved to a file for re-use or to incorporate into an application.

The use of a mouse is now fully supported by Commander. In addition, Windows and Presentation Manager-like file dialog and output redirection boxes are now used throughout Commander, giving the interface a distinctly GUI character.

The I/O speed of both screen and disk has been improved greatly in KnowledgeMan and GURU version 3.1. The net gain in any application depends on the nature of the application and whether it takes advantage of the specific improved operations.



Eight new event handling functions have been added in KnowledgeMan and GURU version 3.1 to give developers the low-level functionality needed to create GUI-like event-driven applications. Sample source code illustrating KGL event-driven programming is included in the 3.1 package.

The 3.1 update price for current GURU customers is \$700. For current KnowledgeMan users, the 3.1 update price is \$450 and includes a full year of service and maintenance. For more information, call (800) 344-5832.

Version 3.1 is available for single-user MS-DOS based PCs, most popular ANs, DEC VAX/VMS and SUN Unix environments. Locking mechanism allow developers to create multi-user LAN applications across these environments. Applications are portable across all operating environments. KnowledgeMan and GURU are extensible through many 3GLs such as C and FORTRAN.

INTELLIGENT ENVIRONMENTS to deliver multi-platform programming tools

Intelligent Environments, 2 Highwood Drive,
Tewksbury, MA 01876

CONTACT: Craig Mitchell, (508)640-1080 x49

Intelligent Environments, Inc. announced it is developing client/server application-development software that will be first to combine the benefits of object-oriented programming and the simplicity of procedural programming. The new capabilities — termed “component programming” by Intelligent Environments—will provide the basis for the next generation of the company’s AM (Applications Manager) products, which are leading GUI-based development tools for high-end workstation operating systems. The software will make object-oriented programming more usable in commercial environments, which have multi-vendor, multi-language development requirements.

Component programming will allow programmers to create, re-use, and modify application modules quickly, using on-line graphical libraries, dictionaries, and procedures. The new product will support workstation operating systems that provide a sound, long-term foundation for line-of-business applications; these include IBM’s OS/2, Microsoft’s Windows NT, and UNIX. The company also plans to support IBM’s Workplace OS initiative, under which a single operating-system kernel will support a range of major operating environments.

Magnus PAGETURNER: Postscript document viewer for OS/2 2.x & WINDOWS 3.1

MAGUS, PO BOX 390965, Mountain View, CA 94039-0965

CONTACT: Gerry Sikora (415) 940-1109

Magus announced its entry into the document-viewing software market: Magus PageTurner. Priced at \$150, PageTurner allows the user to display and print documents produced by virtually any application on any computer, without need for the originating application. “Our strategy is appallingly simple,” said Dr. Kevin Thompson, president of Magus. “PageTurner contains a complete PostScript interpreter. So you can use just about any application you like to format your document, save the output as a PostScript file, and anyone who has PageTurner can view or print the document.”

PageTurner’s reliance on standard PostScript frees the producers of documents from having to acquire proprietary document generation software, and protects their investment in existing software. In addition, users of PageTurner can view documents produced on virtually any computer, be it an IBM-compatible PC, Macintosh, UNIX workstation, mini-computer, or mainframe. Competing viewer products (such as Adobe Systems, Inc.’s Acrobat and No Hands Software’s Common Ground) require a separate program or driver to generate an intermediate file which can be viewed only by the corresponding viewer. These intermediate formats are proprietary, and users must acquire both the file generating software and the file viewer. Not only do these solutions lock the users into these companies’ proprietary generators and formats, but the No Hands solution does not allow viewing of files from computers for which the generating software is unavailable, while the Adobe software requires a separate translation step.

In contrast, Magus PageTurner requires no separate generating software. It relies only on the native PostScript printer drivers already built into the applications or their environments.

PageTurner supports keyword searching, printing of selected page ranges, and magnification and rotation of images. The environment’s native fonts are used when rendering documents; these include Adobe Type 1 and Type 3 fonts for OS/2 2.0, and both Adobe and TrueType fonts for Microsoft Windows 3.1, (Fonts downloaded within a document are available for that document.) Both PostScript and non-PostScript printers are supported.

The OS/2 and Windows versions of Magus

PageTurner will be available in the third quarter of 1993. Support for additional computer types, such as the Apple Macintosh, will follow.

Magus, in Mountain View, Calif., can be reached at (800) 848-8037, (414) 940-1109, or by Email at sales@magus.com. Contact Gerry Sikora for more info.

ULTIMATE OS/2GAME

Every fledging C++ programmer should have a copy of Stroustrup's second edition. I also recommend Coplien's "Advanced C++". Unlike most advanced C++ books, this one is not compiler-specific.

/* FLAME ON */

I finally figured out why OS/2 comes with such boring icons. They were created with IBM's Icon Editor.

I'm getting tired of lame resource tools. The Dialog Editor can't create multi-line text controls. The resource compiler doesn't accept simple arithmetic expressions. The Icon Editor thinks my 256-color icons are for the EGA.

If anyone has a product that might help me keep my sanity, please let me know. If it's any good, I'll endorse it.

Next Month

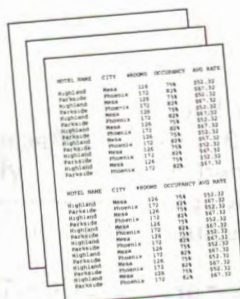
Everything I planned to do this month.

References

Timur Tabi is a graduate student in computer science at the George Washington University. After he graduates in May, he will join IBM in Boca Raton, where he will be (among other things) developing audio device drivers for MMPM/2. He can be reached at timur@seas.gwu.edu or on fido net at 1:109/347.

Bjarne Stroustrup, *The C++ Programming Language*, 2nd ed. Ring, MA: Addison-Wesley, 1992

James O. Coplien, *Advanced C++: Programming Styles and Idioms*. Ring, MA: Addison-Wesley, 1992



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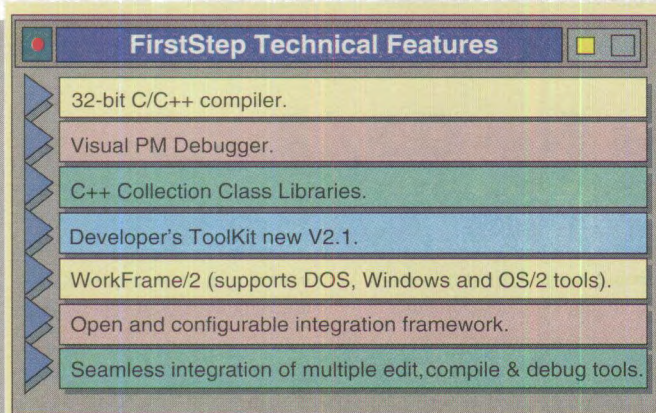
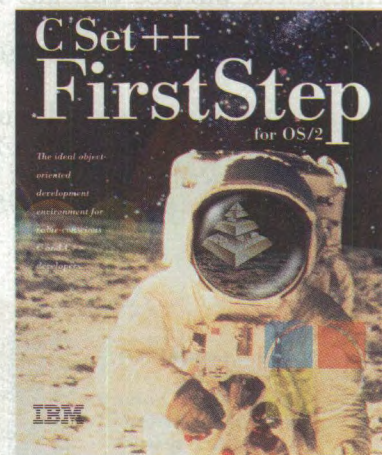


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First Looks

Relish By Sundial is a full featured. Personal Information Manager, or PIM, for those enamoured by acronyms. Its combines a robust time scheduler, sophisticated phone book (with phone dialer), schedule and note manager. Relish is a Presentation Manager application that is fully WorkPlace shell aware. Its nice to be able to drag a schedule entry from the calender to the printer. I've *actually* even needed to grab a line out of the phone book and drop it onto the desktop.

Relish is configurable. You can setup date-time format interpretation, Comm ports, alarm sounds, printer formatting, integrate editors, and more. The Note Palette, which is integrated into the scheduler types of Notes in 6 fruity flavors: Appointments, Meetings, General Notes, Phonecalls, Run an App, or "To Do."

Interested parties can get Relish or the Relish Network version which allows individual or Group scheduling from Sundial (310) 596-5121.

Speaking of Superheros, I found an excellent piece of software. Its called DeskMan/2.

"Wait a minute! What is all this TWO stuff? Best of the Best 2, Home Alone 2, OS/2. Whats going on

here? Didn't they get it right the first time? Wasn't it good enough?"

Sure it was. Especially in this case. DeskMan/2 allows the user to back up either selected objects on his of his desktop or all of his desktop. And, new release with even more features in coming out soon.

One of the neat things about this package is that you do all of your backup and restore right from your desktop. They do it by generating a REXX command for each object you select for backing it up. The beauty here is that you can take these files you create and give them to someone else. Another possible application here would be to standardize a desktop for the people doing installation.

But, that's not all. With this version you also get VUEMan/2, which gives you more desktop space by creating 4 virtual desktops and another nifty tool called DM/2 Image that allows you to quickly restore desktop images.

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